

OCTOBER 1918.]

[Price 6s.]

PROCEEDINGS
OF THE
LINNEAN SOCIETY OF LONDON.



130TH SESSION.

FROM NOVEMBER 1917 TO JUNE 1918.

LONDON:

PRINTED FOR THE LINNEAN SOCIETY,
BURLINGTON HOUSE, PICCADILLY, W.1.

BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.



RISELEY MEMORIAL.

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SUPPLEMENT.

Tulbagh Correspondence.

PUBLICATIONS: SESSION JULY 1917-JULY 1918.

Journal, Botany.

Vol. XLIV.	No. 295.	14/-
" "	" 296.	8/-

Journal, Zoology.

Vol. XXXIV.	No. 225.	20/-
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Transactions, Zoology.

Vol. XVII.	Part 3.	25/-
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Proceedings, 129th Session, October 1917. 6/-

List of [Fellows, Associates, and Foreign Members], Nov. 1917.

PROCEEDINGS
OF THE
LINNEAN SOCIETY OF LONDON.

(ONE HUNDRED AND THIRTIETH SESSION,
1917-1918.)

November 1st, 1917.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General and Adjourned Meetings of the
7th June, 1917, were read and confirmed.

The report of the Donations received since the last meeting was
laid before the Fellows, and the thanks of the Society to the
several Donors were ordered.

The President drew attention to the important donations of
Sir FRANK CRISP, Bt., of the complete series of 'Lindenia' in
17 volumes, of 14 bound volumes of papers with special index by
the Rev. GEORGE HENSLow, and of the volume deposited in the
Society's care by Mr. A. Forbes Sieveking, of Tournefort's
'Histoire des plantes qui naissent aux environs de Paris,' 1725,
with the autograph of Buffon on the titlepage.

Mr. Harry Howard Allan, M.A., Mr. Wellington Ernest Groves,
Mr. Walter Reginald Brook Oliver, Mr. Arthur Anselm Pearson,
Miss Eleanor Vachell, Mr. James Watt, W.S., and Mr. Edward
Berkeley Wilkinson, were proposed as Fellows.

Mr. Henry Brougham Guppy, M.B., Dr. John Rudd Leeson,
F.R.A.S., F.R.M.S., and Mr. Richard Mounsey, F.R.G.S., were
elected Fellows.

Prof. W. A. HERDMAN, F.R.S., F.L.S., read a paper entitled "Spolia Runiana: III. The Distribution of certain Diatoms and Copepoda in the Irish Sea throughout the Year," and illustrated by photographs and lantern-slides.

Prof. Dendy, Mr. E. S. Goodrich, Dr. Marie Stopes, and the President contributed to the discussion which followed the reading of the paper, and the Author replied.

The second paper, "The Germination of *Iris Pseudacorus*, Linn., in Normal and Abnormal Conditions," was read by Lt.-Col. J. H. TULL WALSH, I.M.S., F.L.S. (See Abstract on page 51.)

Mr. Dymes, Dr. A. B. Rendle, the President, and Mr. J. C. Shenstone contributed further remarks on the varying experience of the two experimenters.

November 15th, 1917.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 1st November, 1917, were read and confirmed.

The report of the Donations received since the last meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. John Lawrence Pitchford Hollingworth was proposed as a Fellow.

Mr. E. S. GOODRICH, F.R.S., Sec.L.S., exhibited a series of slides under microscopes illustrating methods of staining embryonic cartilage. He explained the method of staining with Toluidin blue and Thionin blue in bulk and washing the stain out of all the tissues excepting the cartilage. The specimen can then be cleared and mounted in balsam. The best results are obtained with Thionin which stains cartilage deep crimson. Only that variety of Thionin yielding a violet solution in water gives good preparations.

Mr. W. Bateson, F.R.S., addressed a few remarks, which were answered by the exhibitor.

Dr. D. H. SCOTT, F.R.S., F.L.S., gave an exposition of his paper, "Notes on *Calamopitys*, Unger," illustrating his remarks by a series of lantern-slides and a large specimen of *Calamopitys americana*, Jeff. & Scott, from Kentucky.

Dr. E. A. N. Arber and Mr. W. C. Worsdell spoke on the subject of the paper and the Author replied.

November 29th, 1917.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 15th November, 1917, were read and confirmed.

The report of the Donations received since the last meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Dr. James Charles McWalter was admitted a Fellow.

Mr. George Claridge Druce, Hon. M.A. (Oxon.), was proposed as a Fellow.

Mr. Harry Howard Allan, M.A., Mr. Wellington Ernest Groves, Mr. Walter Reginald Brook Oliver, Mr. Arthur Anselm Pearson, Miss Eleanor Vachell, Mr. James Watt, W.S., and Mr. Edward Berkeley Wilkinson, were severally elected Fellows.

The General Secretary reported that a New Linnean Society had been recently established in Sweden as "Svenska Linné-Sällskapet," intended as a means for spreading information about Sweden's greatest naturalist, Carl von Linné (1707-78). It purposes to do this by publication of works by Linné and his pupils; to throw new light from modern standpoints on Linné's personality; to draw up a catalogue of all known memorials; and to found a complete Linnean library. The subscription is ten kroners annually (about 11s. 6d.); for Life Members 200 kroners, and for Patrons 1200 kr. There are to be two meetings annually, in spring and autumn, and more if required. The President is Dr. TYCHO TULLBERG, a lineal descendant of Linné, Dr. J. M. HULTH, Secretary, Court Physician E. FÖRBERG, Treasurer, and Professors ROBERT FRIES and RUTGER SERNANDER as Councillors.

The General Secretary was authorised to convey the Society's cordial greeting to the newly established Society.

Dr. HAROLD WAGER, F.R.S., F.L.S., read a paper on "Intensity and Direction of Light as Factors in Phototropism," illustrated by lantern-slides and models. (See Abstract, p. 53.)

Dr. E. Marion Delf, Prof. Margaret Benson, Lt.-Col. J. H. Tull Walsh, Mr. A. W. Hill, and Dr. D. H. Scott, discussed certain points of the paper, and the Author replied.

He then read his second paper, "Spore-coloration in the Agaricaceæ." (See Abstract, p. 54.)

Miss E. M. Wakefield, Mr. A. D. Cotton, Mr. R. Paulson, Mr. William B. Brierley (visitor), and Dr. A. P. Young engaged in a discussion, the Author replying.

December 13th, 1917.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 29th November, 1917, were read and confirmed.

The report of the Donations received since the last meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. Arthur Anselm Pearson and Mr. Edward Berkeley Wilkinson were admitted Fellows.

Mr. Syed Khurshaid Ahmed, F.R.H.S., was proposed as a Fellow.

Mr. John Laurence Pitchford Hollingworth was elected a Fellow.

Capt. ARTHUR W. HILL, F.L.S., exhibited specimens of Seeds enclosed in a Stony Endocarp and their Germination, and by drawings on the blackboard explained the various modifications displayed.

In certain genera the seed or seeds are protected by inclusion within a stony endocarp. In such cases it is found that definite provision is made during the development of the fruit for the liberation of the seeds on germination from their stony envelope.

In the case of *Prunus* and similar normally one-seeded fruits splitting apart of the two halves of the endocarp takes place, but in such 3-5-seeded fruits as *Canarium*, *Sclerocarya*, *Dracontomelon*, *Saccoglottis*, *Aubrya*, etc., special fenestræ or opercula are provided which are pushed away by the germinating embryo. In *Davidia* not only are special fenestræ removed but also portions of the intervening skeletal structure of the endocarp. The remarkable fruit of *Pleiogynium* encloses several seeds which germinate without any disintegration of the endocarp.

Mr. H. N. Ridley, Dr. O. Stapf, Prof. H. G. Greenish, and Mr. E. G. Baker took part in the discussion which followed, and Capt. Hill replied.

Mrs. HAIG THOMAS, F.L.S., exhibited a long series of skins illustrating various results obtained in crossing species of Pheasants.

The cross between Silver Pheasant (*Gennæus nycthemerus*) and Swinhoe's Pheasant (*G. Swinhoei*) gave a remarkable series of segregating forms in the F_2 generation. Amongst these were birds scarcely distinguishable from *Swinhoei*. The F_1 form was a combination very distinct from the parental types; and, judging from the frequency with which some of the new forms occurred in F_2 , it was evident that they behaved as dominants and likely that they could have been bred true.

The cross *Phasianus versicolor* $\times$ *P. formosanus* had been made reciprocally. Crosses involving several pairs showed that there were consistent differences according to the way in which the cross was made. The egg of *formosanus* is much larger than that of *versicolor*, and in this respect as well as in several details of pattern the F_1 females resembled the fathers. The F_1 females from *versicolor* ♀ $\times$ *formosanus* ♂ were sterile both with F_1 males of F_1 and *formosanus* males, though eggs were laid in two seasons.

The F_1 from the reciprocal (*formosanus* ♀ $\times$ *versicolor* ♂) were fertile, one female laying as many as 90 eggs in one season (12 eggs is a fair average for *versicolor* in England and 35 for *formosanus*). The F_2 series showed a considerable range of forms, and among them were many recurrences of features characteristic of the parental types.

Mr. W. Bateson and Mr. E. S. Goodrich contributed further remarks, and Mrs. Haig Thomas replied.

January 17th, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 13th December, 1917, were read and confirmed.

A memorandum of the Meeting of Fellows summoned by circular to protest against the dismantling of the British Museum, including the Natural History Museum, for use as Government offices, held on Monday, 7th January, 1918, was read as under:—

The President, Sir DAVID PRAIN, in the Chair, stated that the Bye-Laws of the Society did not provide for a Special Meeting of the Society, a defect which needed to be remedied: therefore the present meeting was a Meeting of the Fellows, and not a General Meeting of the Society.

Sir HENRY MCMAHON then moved the adoption of the following Resolutions, which had been approved by the Council:—

The Fellows of the Linnean Society of London in Meeting assembled, desire to place upon record:—

Their profound astonishment and alarm at the reported intention to dismantle the British Museum, including the

Natural History Museum, in order to use it for Government offices :

Their emphatic protest at a procedure which must endanger priceless and irreplaceable possessions acquired at great cost and infinite labour during the last 200 years, constituting the most splendid museum in existence and the recognized centre of systematic scientific research :

Their dismay at a resolution which must paralyse scientific activities that during the past three years have been devoted to work intimately connected with the prosecution of the war :

And at the expenditure of a large sum in adapting unsuitable buildings, whilst other and more suitable accommodation might be provided at much less cost :

And finally to emphasize the disgrace which must accrue to the Nation in the eyes of the whole world, by the evidence thus afforded of the inability of the Government to appreciate the essential value to the Nation of scientific assistance such as the British Museum has rendered and is capable of rendering.

That copies of the foregoing Resolution be sent to H.M. the King, our Patron, the Prime Minister and the other members of the War Council, Lord Sudeley, the Trustees of the British Museum, and the daily Press.

These were seconded by Prof. A. C. Seward, F.R.S., and supported and discussed by Dr. A. B. Rendle, F.R.S., Sec.L.S., Dr. A. Smith Woodward, F.R.S., Dr. F. D. Godman, F.R.S. (by telegraph), Lord Rothschild, F.R.S., Prof. A. Dendy, F.R.S., Dr. Ethel N. Thomas, Mr. J. Britten, Mrs. Haig Thomas, Mr. E. M. Holmes, Lt.-Col. J. H. Tall Walsh, Mr. C. P. Ogilvie, and Prof. J. Percival, and on being put from the Chair were adopted unanimously.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. James Watt was admitted a Fellow.

Mr. George Claridge Druce, Hon.M.A. (Oxon.), was elected a Fellow.

The first paper was by Mr. E. S. GOODRICH, F.R.S., Sec.L.S., on the Restoration of the Superficial Bones of the Head of the Fossil fish *Osteolepis*, illustrated with lantern-slides. Having shown the restorations of Pander, Gregory, and Watson, which differ considerably from each other, Mr. Goodrich described his own restoration of the bones and lateral-line canal system, and drew attention to the importance of an accurate knowledge of the

structure of such an early and primitive form as *Osteolepis*, from the Lower Devonian strata, for a correct interpretation of the homologies of the cranial bones in the higher Fishes and in the Land Vertebrates.

Mr. Goodrich then exhibited a beautifully preserved femur of the flying Pterodactyl *Rhamphorhynchus bucklandi*, obtained by him from the Stonesfield State (Lower Jurassic) quarries near Blenheim.

Mr. JAMES BRITTEN then read his paper, "Some early Cape Botanists," based upon the material preserved in the Sloanean and Banksian collections at the British Museum (Natural History). He traced them from the plants collected by Paul Hermann (1640-95), Oldenland, Oldenburg, Thunberg, Masson, Banks and Solander, and Robert Brown, when he touched at the Cape in H.M.S. 'Investigator,' under Capt. M. Flinders, in 1802.

The portrait of Francis Masson (1741-1805), presented by Dr. W. Carruthers, F.R.S., in 1887, was shown; it is interesting as displaying in the background a view of Table Bay looking due south, with the Devil's Peak, Table Mountain, and Signal Hill shown.

Dr. Stapf opened the discussion; the General Secretary followed, remarking upon the interest of the author's mention of Simon van der Stel, whose name is inseparably connected with the colony's history in such names as Simon's Bay and Stellenbosch. He mentioned the collection of plants sent by Governor C. Rijk Tulbagh in 1769, and his own hope of completing an account of that collection for early publication. (See Supplement.) The President closed the discussion with a review of the interest of those early records, so well brought out by the author.

The last communication was by Mr. C. E. SALMON, F.L.S., on a Hybrid *Stachys*, which originated in his garden, where previously only *Stachys germanica* and *S. alpina* were cultivated; he compared the characters of all three plants, and pointed out that the hybrid was identical with *S. intermedia* [Solander in] Ait. Hort. Kew. ii. 301 (1789).

Mr. F. N. Williams, Mr. E. G. Baker, Dr. A. P. Young, and the President contributed further remarks, Mr. Salmon replying.

February 7th, 1918.

SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 17th January, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. Henry Brougham Guppy was admitted a Fellow.

Mr. Syed Khurshaid Ahmed was elected a Fellow.

Mr. Edwin Henry Kirby and Mr. Frederick William Mills were proposed as Fellows.

The General Secretary gave an account of the 'Panphyton siculum' of Francesco Cupani (1657-1710) which was described by Pritzel as "liber ineditus rarissimus." A few copies, none of which were complete, were issued in 1713 by Cupani's patron, the Prince Della Cattolica, the copy in the library of the Jesuit Fathers at Palermo being the nearest complete, and therefore cited by Gussone in his 'Prodromus' and 'Synopsis'; it consists of 3 volumes with about 700 plates, without text; the copy in our library has only 196 plates, two of which are in duplicate. This was followed by a reissue, in the year 1722 or thereabout, of 168 plates with engraved numbers and names of the plants altered in some cases, but without title or text. Pritzel enumerates 6 copies he has seen, and additional copies in the same state exist in our own library, the Banksian collection in the British Museum, and the Botanical Department of the Natural History Museum, but the last-named copy wants 29 plates. In 1807, Rafinesque, then living at Palermo, issued a prospectus of yet another issue as 'Pamphysia sicula,' which is cited by Gussone, but apparently no copy is known in this country. The single plate in this prospectus is from an engraved plate, whereas the two earlier issues are from etched plates.

Dr. Rendle remarked upon the need for a clearing up of the problems presented by this often-quoted but scarce work.

The second volume shown by the General Secretary was the little anonymous volume, 'L'Histoire et pourtrait des plantes,' Lyon, 1561. The volume belonged to Linné, and a pencil note on the title-page by Smith refers to an entry in Haller's 'Bibliotheca botanica,' i. 318, which proves to be copied from Adanson's 'Familles des plantes,' i. p. 6, where the book is described from Jussieu's library as 'Le Bénéfice commun'—the running headline, not the title—but Jussieu's copy is given as published at Rouen in 1555, and attributed to Dugort; the brothers Jean and Robert Dugort were printers at Rouen at that time, and probably compiled the volume from the Lyons issue of Fuchs's 'Historia stirpium' of 1551, for 19 of the cuts are identical in both books, with 8 not yet traced. At present no help in clearing up the points involved has been obtained from Barbier's 'Ouvrages anonymes,' Quérard's 'La France littéraire,'

or 'Supercheries,' nor has any copy been found in any bibliography or library answering to that shown, which seems to be unique.

Mr. H. B. GUPPY, M.B., F.L.S., then gave an outline of his paper, entitled "Plant-Distribution from the Standpoint of an Idealist."

Dr. D. H. Scott, Mr. W. Bateson, and Dr. J. C. Willis discussed the various propositions put forward, and the Author replied.

February 21st, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 7th February, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. William Bernard Crow, B.Sc. (Lond.), Mr. William Gerald Harding, Mr. James Small, M.Sc. (Lond.), Mr. Fred Stoker, M.B., B.S., F.R.C.S. (Edin.), and Mr. Percy George Thompson, were proposed as Fellows.

Mr. J. BRONTÉ GATENBY read his paper (communicated by the Zoological Secretary), "Notes on the Bionomics, Embryology, and Anatomy of certain Hymenoptera Parasitica, with special reference to *Microgaster connexus*, Nees."

Mr. W. Bateson, F.R.S., Mr. E. S. Goodrich, F.R.S., Sec.L.S., and Lt.-Col. J. H. Tull Walsh discussed certain points in the paper, and the Author replied.

Mr. WILLIAM B. BRIERLEY read a paper (communicated by Capt. Arthur W. Hill), entitled "Experimental Studies in the Specific Value of Morphological Characters in the Fungi." (See Abstract, p. 55.)

March 7th, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 21st February, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

The President referred to two works presented by Mrs. Horsley, namely, a handsomely bound copy of Dr. Braithwaite's 'British Moss Flora,' 3 volumes, and a splendid copy of Schimper's 'Bryologia europæa,' 6 volumes, both from the late Dr. Robert Braithwaite's library, in accordance with his expressed wish.

A special vote of thanks was passed for this valuable gift.

Miss Eleanor Vachell was admitted a Fellow.

Mr. Edwin Henry Kirby and Mr. Frederick William Mills were elected Fellows.

Lord ROTHSCHILD, F.R.S., F.L.S., exhibited a large series of "Mimetic Species of the African Nymphaline genus *Pseudacræa* and the Lycenid genus *Mimacræa*, together with their Acraeinae and Danaïde models and some co-mimics," and read the following summary:—

The exhibition is intended to illustrate not only the strong mimetic tendency in the genera *Pseudacræa* and *Mimacræa*, but also to show that the various cases of mimicry appear to centre round a few given models and is evident in a number of genera not at all related or closely connected. This goes to prove that the variation in a given direction is due to local external conditions and has become fixed by selection and the influence of the Mendelian law. The curious case of *Acraea encedon*, a non-edible species, also mimicking the Danaïde model *Danaïs chrysippus*, goes far to prove this, for the resemblance of two protected insects of different sub-families can only be considered as resemblance or rather similarity produced by one and the same external influence. The exhibit was primarily got together as a supplement to Professor Poulton's wonderful case of the *Pseudacræa poggei* and its new form *carpenteri*. I also exhibit the non-mimetic males of the *Papilio* co-mimics as well as the non-mimetic species of *Pseudacræa*. Special attention is drawn to the unique specimen of the red form of *Pseudacræa imitator*, the *chrysippus*-like *Pentila*, and the *dorippus* forms of *Tetipna* and *Pseudalitis*.

Prof. E. B. POULTON, F.R.S., F.Z.S., showed specimens of a new mimetic form of *Pseudacræa poggei* (Devitz) from ex-German East Africa, with other African mimics of *Danaïda chrysippus* (Linn.).

He also gave an account, illustrated by a large selection of lantern-slides, of "The Mimetic and Mendelian Relationships of the 'White Admirals' of North America," of which the following is an abstract:—

The "White Admiral" butterflies of the Nymphaline genus *Limnitis* or *Basilarchia* (the North American sub-genus) form an

interesting group with peculiar larvæ and pupæ. Their conspicuous patterns are displayed in a floating flight and the under surface of the wings is not procryptically coloured like that of the *Vanessas*—characteristics which are found in the specially protected models for mimicry, and the Müllerian mimics of other still more distasteful species. And so it is with *Limenitis*. The English *L. sibylla* is resembled by the female of the “Purple Emperor” (*Apatura iris*) which flies in the same woods, while the tropical American representatives of *Limenitis*—the powerful genus *Adelpha*—are beautifully mimicked by the females of the representatives of *Apatura*—the genus *Chlorippe*. The African representatives of *Limenitis*—the genus *Pseudacraea*—are almost all of them wonderful mimics of the *Acræas* and in one instance of a *Danaine*.

The North American species form a singularly interesting group divided until recently into six species. Of these, two, *weidermeyeri* and *arthemis*, are black-and-white butterflies somewhat resembling *sibylla*; one, *lorquini*, appears to be a similar butterfly, modified by mimicry of an *Adelpha* or allied form which meets it on the west of the continent; two, *archippus* and *obsoleta* (*hulsti*), are beautiful mimics respectively of *Danaida* (*Anosia*) *plexippus* and *D. strigosa*, both ancient *Danaine* invaders from the Old World into the New; finally one, *astyanax*, is a mimic of *Papilio philenor* or more probably of *Papilio* co-mimics of the same model. *Astyanax* is also, according to Scudder, the model for the female of *Argynnis diana*.

The black-and-white *arthemis* of the north and the southern dark *astyanax* meet and overlap in a narrow zone where an intermediate form *proserpina* is also found, considered by Scudder as a hybrid between the two. The recent successful breeding experiments of W. L. W. Field leave no doubt that *proserpina* is certainly a heterozygote which splits up into the two parent strains in the F_1 generation. In the light of this important result *astyanax* becomes the southern race and *arthemis* the northern of a single species, but the rarity of *proserpina* seems to prove the reality of sexual preference within each race in the zone of overlap.

Lord Rothschild, Mr. W. Bateson, Dr. G. B. Longstaff, Mr. Hamilton H. C. J. Druce, and Sir Henry Howorth, F.R.S. (visitor), engaged in a discussion, the Author replying.

Mr. HAMILTON DRUCE exhibited several species of *Mimacræa* from his collection, amongst them *M. Landbecki*, *M. Eltringhami*, *M. Krausei*, and *M. skoptoles*.

March 21st, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 7th March, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Miss Edith Grey Wheelwright was proposed as a Fellow.

Mr. William Bernard Crow, B.Sc.(Lond.), Mr. William Gerald Harding, Mr. James Small, M.Sc.(Lond.), Mr. Fred Stoker, M.B., B.S., F.R.C.S.(Edin.), and Mr. Percy George Thompson, were elected Fellows.

Mr. E. S. GOODRICH, F.R.S., Sec.L.S., exhibited specimens illustrating the shoulder-girdle of a Dicynodont reptile from South Africa, with remarks on the Origin of the Mammalia, with drawings on the blackboard.

Mr. JAMES GROVES, F.L.S., showed a large series of photographs and some lantern-slides of the remains of fossil Characeæ from the Lower Headon Beds, taken by the late Clement Reid, and made some remarks as to the antiquity of the family, undoubted remains of which are found as far back as the Inferior Oolite. Mr. Groves also referred to organisms in earlier Formations, which might prove to be ancestral forms.

Dr. D. H. Scott contributed some supplementary remarks on these interesting fragments.

Miss B. MURIEL BRISTOL, M.Sc., read a paper, communicated by Prof. G. S. West, F.L.S., "On a Malayan Form of *Chlorococcum humicola* (Naeg.), Rabenh.," with lantern-slides from her two plates.

Dr. D. H. Scott commented on the interest of this alga being derived from the soil dried for years, and being capable of renewing its vital functions after so long a period of rest. He alluded to a recent flooding above the source of the River Test of certain areas in Hampshire, which had not been under water for about 30 years, and yet in the pools which remained after the flood abundant algal growth was present.

Mr. Paulson put certain questions to the Author, who replied, and said that she had found about 60 species of algæ which grew in soil.

Other morphological characters of *Botrytis cinerea*—rapidity of growth, minute details of physiology of parasitism, septation and branching of conidiophore, structure of sclerotia, etc.—are being investigated, and are yielding results of a similar nature, and it appears not improbable that the present species in the *Polyactis* group of the genus must be regarded as host forms of elementary species of *Botrytis cinerea*.

"Modal variation" is not due to physiological starvation or repletion or other known nutritional conditions resulting from various substrata. It is suggested that it may be due to some growth-stimulant or accessory food-factor, which is constantly present to a different degree in different food-substrata.

Mr. W. Bateson, F.R.S., Miss A. Lorrain Smith, Dr. Ethel N. Thomas, and Mr. A. A. Pearson engaged in a discussion, the Author replying.

April 18th, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 21st March, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. James Small, M.Sc. (Lond.), was admitted a Fellow.

The Rev. Canon George Russell Bullock-Webster, M.A. (Cantab.), Heber Albert Longman, and Arthur William Rymer Roberts, were proposed as Fellows.

The President announced a vacancy in the list of Associates due to the death of Mr. Ernest David Marquand.

The following Auditors were nominated:—For the Council: Mr. E. T. BROWNE and Mr. G. W. E. LODER; For the Fellows: Mr. T. A. DYMES and Mr. W. BARRATT, and they were elected by show of hands.

Prof. J. P. HILL, F.R.S., F.L.S., then gave an account of his expedition to Brazil in 1913, due to grants from the Government Grant Committee and Council of the Royal Society, and the Trustees of the Percy Sladen Fund. The primary object was to obtain material for studying the development of certain American Marsupials, the most familiar being the American Opossum. When the expedition was organized, our knowledge of the development of *Didelphys* rested on the incomplete account given by Emil Selenka in 1886; the author's own observations on the Australian native Cat, *Dasyurus*, differed essentially from Selenka's statements, and it was hoped to get the material for a renewed study of the former. Another point was to determine the development of those genera regarded on anatomical grounds as nearest the base of the Didelphyd series, namely *Marmosa* and *Peramys*; these are small rat-like creatures, remarkable for the entire absence of the pouch so characteristic of the other members of the order. The author was accompanied by his friend and former pupil, Mr. G. S. Sansom, B.Sc., now Major, R.A.F.

It was decided to make Rio de Janeiro the centre of operations. Leaving Southampton on the 20th June, 1913, the party reached Rio on the 6th July, with four clear months for collecting. Well equipped with all material necessities, such as traps of various kinds, preservatives, tents, and provisions, their knowledge of Portuguese was limited, and the local distribution of the mammals to be studied was practically unknown. By permission of the Brazilian Minister of Agriculture, and on the invitation of Dr. J. C. Willis, at that time Director of the Jardim Botânico at Rio, the author and his friend had the use of the large and well-equipped laboratory attached to the gardens, and thanks to the kindness of scientific men in Brazil, very gratifying success attended the efforts of the expedition.

Collecting began in the precincts of Rio whilst awaiting the Customs clearance of the stores, which took three weeks to effect, and specimens of the "Gambá"—the Brazilian Opossum, *Didelphys aurita*, were soon obtained. Here, in the neighbourhood of the gardens, about 8 miles from the centre of Rio, and within the range of sound from the electric tramways, no fewer than five species of Didelphyds belonging to four genera were collected. The next collections were made on the Itatiaia Range on the borders of San Paulo, at heights of 800 to 1500 metres. Then the expedition moved north to the State of Espirito Santo, in the neighbourhood of Mimoso, moving afterwards to the State of Minas Geraes at Gorduras, on the estate of the St. John del Rey Mining Co., Morro Velho. Returning to Rio, the party visited Therezopolis in the Serra dos Orgãos, north of Rio, about 900 metres in altitude; this proved an ideal spot, with fine bracing climate, a rich fauna, beautiful scenery, and a very comfortable hotel.

Summing up the results, the expedition may be regarded as successful, though all its objects were not attained. Besides the material for anatomical investigation, a small collection of Rodents was brought back, about eight genera of Muridæ, and an interesting series of frogs, about 22 species, two being new.

No adventures worth recording occurred; the climate during the stay of the expedition was found to be excellent. The forest mosquitos, bush-ticks, and, in Espirito Santo, a vicious little blood-sucking fly, *Stomoxys*, were the chief unpleasant items.

The lecture concluded with a large series of lantern-slides.

A short discussion followed, in which Mr. E. S. Goodrich, F.R.S., Sec.L.S., Mr. Ernest Gibson, and the President took part.

May 2nd, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 18th April, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. John Laurence Pitchford Hollingworth was admitted a Fellow.

Mr. William Wright Smith was proposed as a Fellow, and Mr. Walter Watson, B.Sc.(Lond.), as an Associate.

Miss Edith Grey Wheelwright was elected a Fellow.

A paper by Mr. GEORGE M. THOMSON, F.L.S., entitled "On a new Fresh-water Shrimp (*Caridina*) from Fiji," was read in title by the Zoological Secretary.

Dr. MARIE STOPES, F.L.S., gave the substance of her paper, "*Bennettites Scottii*, sp. nov., a European Petrification with foliage."

A discussion followed, in which Dr. D. H. Scott, Miss Madeline Carson, and Prof. Margaret J. Benson took part, the Author replying.

Dr. STOPES also gave an account of her work, entitled "A Survey of the biological aspect of the constitution of Coal," which was explained and illustrated with lantern-slides. The history of the complicated substance known as Coal was narrated, from its earliest microscopical investigation in 1833 by H. T. M. Whitham, and shortly afterwards by William Hutton (1798-1860). Four special substances were particularized as building up coal, and some concluding remarks were devoted to the ecological aspect of coal in its formation in geological times.

Dr. D. H. Scott and Dr. A. Smith Woodward contributed additional remarks, and the Author replied.

May 24th, 1918.

Anniversary Meeting.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 2nd May, 1918, were read and confirmed.

The report of the Donations received since the last General Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Dr. John McEwen Dalziel, Mr. Fred Stoker, M.B., Mr. Percy George Thompson, Mr. Walter Reginald Brook Oliver, Mr. George Claridge Druce, and Mr. Ernest Gibson, were admitted Fellows.

Mr. Lester Vallis Lester-Garland, M.A.(Oxon.), was proposed as a Fellow.

The Treasurer made his Annual Report on the Accounts of the Society, and the Statement (see pp. 18-20), duly audited, was received and adopted.

The General Secretary reported that since the last Anniversary the following had died or their deaths been ascertained, namely :—

13 Fellows.

Hermann Franz Becker.	Ethel Sargant.
Robert Braithwaite.	Worthington George Smith.
Ethel Louise de Fraine.	Richard Spiers Standen.
Charles Thomas Druery.	Major Sidney Miles Toppin.
Kate Marion Hall.	Philippe Levêque de Vilmorin.
William Singer McMillan.	Edward John Woodhouse.
Cuthbert St. John Nevill.	

1 Associate.

Ernest David Marquand.

That the 5 following Fellows had withdrawn :—

Alice Laura Embleton.	James Alfred Wheldon.
Cecil Hallworth Treadgold.	Rt. Hon. Thomas de Grey,
Aubyn Trevor-Battye.	Lord Walsingham.

And that the Council had removed the 5 following from the List, in accordance with the Bye-Laws, Chap. II. § 6 :—

Thomas Maldon Fitch.	Edgar Norman Langham.
Montague Hill.	Charles William Mally.
William Kirkby.	

24 Fellows have been elected, of whom 20 have qualified for admission.

The Librarian's report was read, showing that donations from private individuals and editors amounted to 70 journals and 632 pamphlets and parts, by exchange 68 volumes and 461 parts, and by purchase 38 volumes and 221 parts; in all, the accessions amounted to 176 volumes and 1314 pamphlets and parts.

Books bound amounted to 160: 3 in morocco, 86 in half-morocco, 10 in buckram, 49 in cloth, and 12 re-labelled.

The General Secretary having read the Bye-Laws governing the Elections, the President opened the business of the day, and the Fellows present proceeded to vote for the Council and the Officers.

The Ballot having been closed, the President appointed Dr. Ethel N. Thomas, Mr. B. B. Woodward, and Mr. Robert Paulson to be Scrutineers; and these, having examined the Ballot-papers and cast up the votes, reported to the President, who declared the Council to be as follows:—

Mrs. AGNES ARBER, D.Sc.; EDMUND G. BAKER, Esq.; WILLIAM BATESON, F.R.S.; R. H. BURNE, Esq.; Sir FRANK CRISP, Bart.; *STANLEY EDWARDS, F.Z.S.; *Prof. J. B. FARMER, F.R.S.; E. S. GOODRICH, F.R.S.; Dr. B. DAYDON JACKSON; *C. C. LACAITA, Esq.; Miss G. LISTER; HORACE W. MONCKTON, F.G.S.; Dr. G. E. NICHOLLS; Prof. H. G. PLIMMER, F.R.S.; *R. INNES POCOCK, F.R.S.; Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S.; Dr. A. B. RENDLE, F.R.S.; Dr. D. H. SCOTT, F.R.S.; *Miss A. LORRAIN SMITH; Lt.-Col. J. H. TULL WALSH.

(New members of Council are shown by an asterisk; the retiring Councillors being: Mr. E. T. BROWNE, Mr. A. D. COTTON, Mr. JAMES GROVES, Mr. GERALD LODER, and Dr. A. E. SHIPLEY.)

The Ballot for the Council having been closed, the President appointed the same Scrutineers; and these, having examined the Ballot-papers and cast up the number of votes, reported to the President, who declared the result as follows:—

President: Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S.

Treasurer: HORACE W. MONCKTON, F.G.S.

Secretaries: Dr. B. DAYDON JACKSON.

E. S. GOODRICH, F.R.S.

Dr. A. B. RENDLE, F.R.S.

The President then delivered his Presidential Address, “On the Effects of the Business of Life on the Beginnings of the Science of Natural History.”

TREASURER'S ACCOUNTS FOR THE YEAR ENDED APRIL 30TH, 1918.
(Presented at the Anniversary Meeting, May 24th, 1918.)

Receipts and Payments of the Linnean Society from May 1st, 1917, to April 30th, 1918.

General Account.

<i>Receipts.</i>		<i>Payments.</i>	
	£ s. d.		£ s. d.
Balance at Bankers on 1st May, 1917.....	412 16 5	Taxes and Insurance	41 14 5
Cash in hand.....	7 13 0	Repairs and Furniture	83 8 7
Interest on Investments	304 1 9	Coal, Electric Current, and Gas	64 6 3
Admission Fees	114 0 0	Salaries	701 3 4
Annual Contributions	1497 0 0	Library:—	
Compositions.....	167 0 0	Books (New Books £43 10 1).....	£106 1 7
		Binding.....	52 2 7
Sales of Publications:—			
Transactions	£34 14 0	Expenses of Publications:—	
Journals	62 2 9	Printing	£336 15 5
Proceedings and Catalogues	9 16 0	Illustrations	163 9 1
		Distribution	27 8 2
	106 12 9		
Fellows' postal account, deposits	15 16 2	Miscellaneous Printing and Stationery	530 12 8
Donations in aid of Publications	75 0 0	Petty Expenses (including Tea and Postage)	96 1 6
Miscellaneous Receipts	24 7 3	Fellows' postal account	3 11 1
Proceeds of Sale of £42 1 5 Great Indian Peninsula Railway Annuity Class B	625 3 8		
		Investment £400 National War Bonds 5 per cent.	400 0 0
		Linnean Medal	15 5 0
		Balance at Bankers, 30th April, 1918	
		(including £82 13 7, deposits, Fellows' postal account)	£1165 8 8
		Cash in hand	10 1 11
			1175 10 7
			<u>£3349 11 0</u>

Separate Account.

		£	s.	d.
To Balance at Bankers, 1st May, 1917:—				
Westwood Fund	£17	6	5	
Trail Award Fund	8	16	0	
Crisp Award Fund	30	9	4	
Hooker Lecture Fund	41	10	0	
Tagart Fund	9	6	8	
	107	8	5	
„ Interest on Investments:—				
Westwood Fund	£8	12	9	
Trail Award Fund	3	10	0	
Crisp Award Fund	7	17	8	
Tagart Fund	18	11	0	
Hooker Lecture Fund	22	17	10	
	61	9	3	
				<u>£168 17 8</u>
By Binding of Books (Tagart Fund)				
„ Medal and Award (Crisp Fund)		3	19	9
„ Hooker Lecture (Hooker Lecture Fund)		30	10	0
„ Purchase of £50 National War Bonds 5%		26	5	0
„ Balance at Bankers, 30th April, 1918:—		50	0	0
Westwood Fund	£25	19	2	
Trail Award Fund	12	6	0	
Crisp Award Fund	7	17	0	
Hooker Lecture Fund	38	2	10	
Tagart Fund	23	17	11	
	108	2	11	
Less £50 invested in National War Bonds not yet allocated	50	0	0	
				<u>£168 17 8</u>

*Investments on April 30th, 1918.**General Account.*

£	s.	d.	
1150	0	0	Metropolitan Consolidated 3½ per cent. Stock.
450	0	0	Forth Bridge Railway 4 per cent. Stock.
1000	0	0	Metropolitan Consolidated 3 per cent. Stock.
1200	0	0	India 3 per cent. Stock.
1000	0	0	Eastern Bengal Railway 4 per cent. Debenture Stock.
1000	0	0	Great Western Railway 4 per cent. Debenture Stock.
300	0	0	Midland Railway 2½ per cent. Preference Stock.
200	0	0	5 per cent. War Loan, 1924-47.
400	0	0	" National War Bonds, 1927.

Separate Account: Investments on April 30th, 1918.

£	s.	d.	
£870	9	5	Metropolitan Water Board 3 per cent. "B" Stock (Westwood Fund).
			Ditto ditto (Hooker Lecture Fund).
	100	0	New South Wales 3½ per cent. Stock (Trail Award Fund).
	252	18	2½ per cent. Consolidated Stock (Crisp Award Fund).
	530	0	East Indian Railway 3½ per cent. Debenture Stock (Tagart Fund).
	50	0	5 per cent. National War Bonds, 1927.

- HORACE W. MONCKTON, *Treasurer.*

We have in conjunction with the Professional Auditor, who certifies as to all details) audited the Accounts of the Society for the year ended 30th April, 1918, and found them correct. We have verified the Investments and Bank Balances.

Dated this 9th May, 1918.

W. B. KEEN, *Chartered Accountant.*

DAVID PRAIN,
T. A. DYMES,
EDWARD T. BROWNE,
WALTER BARRATT,
G. W. E. LODER,
B. DAYDON JACKSON,
Auditors.

PRESIDENTIAL ADDRESS, 1918.

ONCE more we stand indebted to our Treasurer, our Secretaries, and our Councillors for services that have made this session successful and have maintained the security of our corporation.

To our Auditors we owe this year especial gratitude. Their duties have been rendered difficult owing to circumstances beyond the control of your officers; their labours were completed only yesterday. I ask you to permit the thanks of the Society for their care to be placed on our records.

Again we mourn the loss of many valued colleagues. Two of our younger members, Mr. Cuthbert St. John Nevill and Mr. Edward John Woodhouse, have laid down lives of much promise in our defence. Among veteran members we lament the deaths of Dr. H. F. Becker, Dr. Robert Braithwaite, and Mr. Worthington G. Smith, whose Fellowship with the Society had attained or exceeded half a century. In Mr. C. T. Druery we have lost an honoured Fellow, full of years, whose observations helped to inspire others to undertake researches of moment. The untimely death of Miss Ethel de Fraigne has deprived us of a colleague whose work had justified the expectation of further valuable results. In Miss Ethel Sargent and Mr. Philippe de Vilmorin we have lost eminent Fellows, who were also personal friends.

The 15 names recited in the sad roll-call of our General Secretary include no fewer than 13 of our Fellows whose interests were concentrated on the cultivation of the natural history of plants.

A year ago you gave attention to a survey of the relationship between the pursuits of our Society and the business of life. Let us to-day take some account of the effects of the business of life on the beginnings of the science of natural history.

The records of kitchen-midden, lake-dwelling, and burial-barrow are not less trustworthy because they are unwritten. They tell us that early man had, among other preoccupations, to consider what he should eat and wherewithal he might be clothed. There are tribes whose social economy remains roughly comparable with that of our ancestors. Where they have succeeded in surviving the benefits of western civilization such tribes find these two exigencies urgent still. The influence of these needs has been as widespread as it has been enduring. They were in all men's minds when the foundations of the Christian faith were being laid; *πάντα γὰρ ταῦτα τὰ ἔθνη ἐπιζέουσιν*.

The first gospel inculcates a Therapeutan disregard of these primitive questions. While, however, the pursuits of our Society prove that man does not live by bread alone, the law that he shall

eat his bread in the sweat of his face has not been abrogated. Recurring mediæval sumptuary enactments indicate that the Essene injunction was not always observed, and the State has again intervened to strengthen faith. We are under dictation, not only as to what, but as to when and as to how much we may eat. Vicarious thought is being taken as to what we shall wear.

Necessity, foster-mother of discovery and invention, has made man at all periods a practical student of natural history. His achievements in this field are written in archæological, ethnological and economic chronicles. Even had time allowed, we may therefore omit a survey of his triumphs, and be content with random allusions to some of his more enduring successes.

In our latitudes man learned to appreciate the merits of the native oyster and to relish an apple too austere, perhaps, for our more fastidious palates. Modern feasts begin and end with these prehistoric dishes. If under other skies he were content to clothe himself with leaves or hammered bark, in our keener air he chose a cloak of rough-dressed pelt. Though garments of the former type have not found favour among us, a widespread reversion to raiment of the latter kind is an outstanding modern fashion. From the first man indented on every realm of nature for his shield and spear, his shot and sling, his shaft and bow. A like catholicity marks the requirements of our newest military arm.

Widened acquaintance with the facts of natural history enabled man to keep cattle and to tame the earth itself. In these pursuits he learned to select and to breed. That his results were empirical only makes them more impressive. If we, by taking instructed thought, may now in a lifetime surpass the achievements of ages, this is because the study of the natural history of nutrition and inheritance has revealed truths undreamt of in earlier philosophy.

Similar advances in knowledge taught man to spin thread and weave webs from the hair of the beasts in his flocks and the bast of the plants in his fields. He was thereby enabled 'to array him in vestures' more seemly than his older coats of bark and skin. He did more, however, than this; he thus unwittingly laid the foundations of that organized industrial system whose social consequences disquiet us to-day.

These results did not exhaust man's interest in natural history. His flocks and his crops were open to attack by beast and fowl and fly. The watch and ward their safety called for had to be sleepless. But his care was only effective where the habits and life-histories of his enemies were understood. Dwellers in fenced and settled lands forget how much this involved. The boy in blue with his horn lives only in a nursery-rhyme; the lad in grey with his rattle is all but a memory; the scarecrow is a surviving relic of an elaborate defensive system. The old anxiety is still understood in regions where the great carnivora threaten the fold; where hog and bear endanger the harvest; where the eagle may levy toll on the flock; where the locust, in an hour, may convert a smiling landscape into a leafless waste.

In one section of this field of study man long remained less successful. The blights and murrains of crops and herds have always been matters of concern. Dominated by a hypothesis which obscured the issue, man once strove to avert such attacks by propitiatory rites which might include the congenial task of slaying his neighbour, or the awkward duty of sacrificing his offspring. As experience brought enlightenment measures of precaution were devised. The reasons for these were not always appreciated by the crowd. This difficulty was overcome, and the observance of the necessary measures ensured, by their incorporation in the ritual of religion. Assured in later days that 'the law had been fulfilled,' man felt it right to sit with folded hands, and to regard such visitations as signs of divine displeasure against which it were blasphemy to murmur and impiety to contend.

To us has come a new understanding. We now assume that 'heaven best helps those who strive to help themselves,' and cope with our blights and murrains by direct defence and flanking counter-attack. But in our efforts to mitigate the harm that pathogenic organisms cause, success depends on the extent to which we adopt the principles that guided early man when dealing with dangers he could comprehend. Diagnosis and treatment are only satisfactory when we have established the identity and mastered the life-history of these organisms.

Even in this portion of natural history the faculty of observation and the instinct for experiment permitted early man to lay, without knowing it, a sure foundation for future work. He learned to control the preparation of substances that assuaged his thirst and at the same time made his heart glad. The philosophical study of the technique of that achievement has added a new chapter to our science. If this increase in knowledge may not always have improved the quality of what is set before us 'when we take our ease in our inn,' we are none the less grateful to those who have afforded the surgeon assurance that his wounds need no longer become corrupt, and have enabled the physician to contend against 'the pestilence that walketh in darkness.'

Primitive rural economy was at first differentiated into occupations comparable with the two branches of natural history that our Society cultivates. The amity which distinguishes our proceedings has not always marked their mutual intercourse. The 'keeper of sheep,' whose to-morrows were so often occupied with search after new pastures, may well have disturbed the 'tiller of the soil' who had fixed his abode and set limits to his fields. But the dispute which culminated in an ancient tragedy had an extrinsic origin. The merits of that case we need not discuss; the narrative may owe something to the inspiration of a priesthood which was not vegetarian; it contains nothing offensive to the susceptibilities of a race with a pastoral ancestry.

In our latitudes such conflict of interest as may have taken place proved capable of adjustment. Among us the two crafts have long been carried on side by side; many of our husbandmen

have given impartial attention to the simultaneous care of crops and stock. If recent times have seen some reversion to the early differentiation, this has been a consequence of that wider economic revolution which subordinated the interests of rural economy to the exigencies of traffic and manufacture. The form this change has taken is attributable to neglect rather than to antagonism on the part of unsympathetic forces.

New and urgent exigencies now compel the State to substitute control for neglect and to disregard the doctrinaire objections of discordant interests. But the machinery of control is of necessity largely guided by habits of thought, the product of the industrial situation which has made the control imperative. The authority to exercise that control is derived from a section of the community which differs from its counterpart in earlier commonwealths mainly in a disposition to provide its own amusements and to endure discomfort without complaint while so engaged. It is hardly surprising that those whose horizon is essentially urban and industrial should find their task full of complexity. The natural historian can forgive their bewildered irritation at the discovery that an appreciable increase in the output of starch may, unless foresight be displayed, involve a compensating reduction in the supply of fat.

While the standard crops of a region are mainly conditioned by the prevalent climate and soil, man, as a practical natural historian, has often been a determining factor in the establishment of staples whose introduction may have modified the economy and influenced the civilization of a race. The importance of this activity is shown by the existence of traditions that attribute the cultivation of particular cereals in their several countries to the agency of an Egyptian god, a Chinese emperor, or a North American chief. But we find illustrations of this activity that are nearer in space and time. Two of our staple crops bear names which reveal their foreign origin and their recent arrival. The presence of these roots has, since the days of our grandfathers, revolutionized practice in one branch of husbandry. This deliberate acclimatization of plants by man is, indeed, a matter that deserves more than passing notice.

One effect of the reliance we place on formal publication when disputes as to priority have to be settled is a tendency to disregard claims to which this touchstone is not applicable. The legend as to the advent of wheat to Egypt, and the accepted account of the introduction of the potato to Ireland, appeal differently to our minds. The one we dismiss as a 'folk-tale,' the other we commend to the attention of the conscientious historian.

If we discard prepossession and consider the two stories with equal sympathy we observe certain differences between them. The first tells us that wheat went from one old world continent to another; the second assures us that the potato came from the new world to the old. It took this country two centuries to

learn that the potato is entitled to that qualified commendation which a soldier-king is said to have bestowed on his army ration; it has taken Britain more than another century to realize that her fate may depend upon the propagation of this tuber. We do not hear that any such difficulties attended the cultivation of wheat in the valley of the Nile. But there is another difference between the tales. The myth of Osiris and wheat has come true; in Gilead, where Osiris found it, a wheat grows wild still. The story of Raleigh and the potato is hardly so fortunate; the potato is not wild in Virginia, whence Raleigh is thought to have brought it.

We do not, on this account, treat as a fable the tale which links the name of Raleigh with a familiar and important vegetable. But no more are we entitled to do this as regards the legend which associates Osiris with wheat. If tradition, as compared with history, pay less attention to formal consistency, she has the advantage of being able to preserve the atmosphere in which her incidents occur. History has her own perplexities; her efforts to reconcile authorities at times involve her facts in obscurity.

This fate, as those who try to trace the history of cultivated plants are well aware, is one to which facts connected with acclimatization are singularly liable. An instance familiar to our fathers affords an illustration.

That undertaking involved, like the action of Osiris, the subjection to husbandry of a plant previously wild; like that of Raleigh, the transfer of a useful species from the new world to the old. Although in its beneficial consequences the enterprise of last generation be comparable with these older ones, there was a time, less than three centuries ago, when its accomplishment by this country had been unthinkable. If the first heat of the great ecclesiastical revolution in northern Europe had died down before the fame of a Peruvian remedy for malaria reached our hemisphere, enough of its glow survived to prevent the ague-stricken Protestant from endangering his spiritual health by using a specific so sinister as 'Jesuits' bark.' A century had to elapse before an accomplished English naturalist could allay a prejudice that appears singular to-day. Another century passed before a saner public spirit and an enlightened solicitude for the welfare of mankind sanctioned the proposal to introduce the trees which yield that bark to India. The enthusiasm of a far-seeing traveller carried the project to a successful issue, and just as popular belief has linked the name of an Elizabethan voyager with the potato, so will history associate the name of a Victorian one with Cinchona.

But great events of natural history are as much the sport of fortune as those of her civil sister. The dictates of medical fashion have made it more economic to cultivate, where this can be done, one especial kind of Cinchona. Should that fashion persist the cultivation of other kinds may cease. This particular kind chances to be one that was independently introduced. But

this does not lessen the debt of humanity to Markham, or dim the honour in which history will always hold his name.

An instance of acclimatization within our own memories may in time tell a similar tale. A Brazilian vegetable-product, which owes its English name to the accident that it may be used to erase pencil-marks, proved so effective a material in the making of raincoats that these garments have furnished their designer with a 'short-cut to immortality.' In the course of this adaptation to one of man's primitive needs this substance developed possibilities and induced demands which made it worth while to treat the tree that yields it as *Cinchona* was treated. Within a generation the financial interests involved, in our Eastern dependencies alone, are said to have reached 'nine figures.' The details of this history are clear. Many of those who helped to make it are still alive. This, however, has not prevented international finance, for objects of her own, from turning to account an incautious scientific surmise and trying to invest the tale of the introduction of Rubber with some of the qualities of a myth.

Intercourse with races still partly dependent on the forest for what they eat and wear enables us to appreciate how much knowledge of wild nature man may acquire in a life-time, and to realize that this knowledge is not always limited to animals and plants that are useful or hurtful. The opportunity of studying those races while engaged in the assimilation of European culture teaches us how rapidly such knowledge may disappear. A new generation sees life from another standpoint. The young acquire information and imbibe beliefs unfamiliar to their elders. The repugnance they are urged to entertain towards the faith of their fathers induces a correlated contempt for what their fathers knew. The didactic instruction of the schoolroom replaces the liberal education which intimacy with nature imparts. The faculty of observation is left unexercised and suffers from the atrophy which attends disuse.

There is nothing new in this, nor is the tendency confined to 'selvage men.' The phenomenon was noted by a father of our science among a people so polished as the ancient Greeks. Writing of plant-lore generally this author has remarked that "most of the wild kinds have no names and few know about them, while most of the cultivated kinds have received names and they are more commonly observed." We, too, sometimes find that advances in knowledge, whether literary or scientific, may be accompanied by a loss of interest in wild nature.

But even as regards 'cultivated kinds,' and even among those who have escaped the inhibiting influences of library or laboratory, there is a marked contrast between the effects of Greek culture and those of the 'organized efficiency' which Europe accepts as a substitute for civilization. Concerning these 'cultivated kinds' our Greek author could say: "for as many people make use of them they are also led to study the differences." Among

ourselves the practical man leaves this study largely to experts; his interest is satisfied with an empirical knowledge as to how some special 'cultivated kind' may be grown and what the market-price of its product is likely to be. A fair estimate of his conception of 'differences' may be formed from his attitude towards the two recently introduced root-crops which now play so important a role in his economy.

Notwithstanding the dependence of husbandry upon natural history, our pursuits cannot be looked upon as derived from the practice of their respective crafts by the herdsman and the acreman. If the righteousness of the first 'keeper of sheep' may not be imputed to our studies, they do not bear the mark of reproach which was set upon the first 'tiller of the soil.'

The craft which enabled man to find food before husbandry began was not abandoned when herds were kept and the soil was tilled. The old and the new activities often went on side by side. At times the chase remained the chief means of livelihood; herding and tillage were only ancillary. Even in well-cultivated regions the need to safeguard fold and field kept the hunting instinct alive.

With increased knowledge of natural history the chase underwent developments as striking as any that husbandry can show. Man invented the snare and the lure; he enlisted the aid of horse and hound and hawk. The later evolution of the craft proceeded on divergent lines under different circumstances. Where man remained primarily a hunter he perfected his skill; when he became essentially a husbandman he placed more reliance on stratagem. But in either case improvement in practice and device depended upon more complete acquaintance with the habits of the quarry.

Sometimes a special relationship grew up between the old and new vocations. Lands devoted to husbandry were liable to periodic attack by tribes inured to the chase. Occasionally the aggressor absorbed in perpetuity the earned increment of his victim and rooted himself as a commensal in the invaded region. An assertive ethnic strain developed into a ruling caste among whose members a firm grasp of the 'mystery of hunting' remained an essential accomplishment, mastership in which was an ambition worthy of kings. The survival of this habit was made to serve political ends; the satisfaction of this instinct helped to secure the position of a dominant class and to maintain unimpaired its capacity to exercise acquisitive propensities. The fulfilment of this policy involved the reservation and, at times, the forcible creation of wastes and forests. The existence of such enclosures has never in itself been repugnant to the 'keeper of sheep' or the 'tiller of the soil'; the original home of the parents of both is known to us by the name appropriate to a deer park of the Great King. But the

enactments safeguarding such sacrosanct areas have, none the less, often proved 'rocks of offence' to husbandry. Even where the 'tiller of the soil' and the 'keeper of sheep' have participated in the chase, the community at large has, at times, tended to segregate into game-keepers and poachers.

In patriarchal days the 'dweller in tents' sometimes proved more than a match for the hunter. We have a record of the transfer of a birthright in exchange for a dish of lentils, followed at a later date by a deflected benediction. The descendant of the astute shepherd who is our authority for these incidents seems to regard both transactions as legally binding. The pathos blended with the details of the second suggests a lingering doubt as to its equity.

How far the classical hunter may have been a student of natural history is not clear. The fowler who spread his nets on Latin hillsides must have noted the times and seasons of the birds of passage. But the senator who found it politic to humour the hunting instincts of the mob by the slaughter of beasts in the arena, when he took part in the chase himself, had to borrow the keen hounds of his neighbours beyond the Gallic border.

The pages of mediæval and renaissance hunting books show that their writers were imbued with some of the spirit which informs our studies. If their ideas as to affinities were more crude than those of the modern sportsman, at least they were his worthy rivals in their knowledge of 'the lives of the hunted.'

We who stay at home at ease are sometimes inclined to look with misgiving upon the 'bag' of the 'mighty hunter' of the present day. If we could read the thoughts of those who inhabit the waste places of the earth we might find that the layer of the scourges of herd and field is occasionally regarded as a vicar of providence. One daughter-society of our own is indebted to many a modern Nimrod or Maximilian for willing aid in settling vexed questions as to the identities and life-histories of fowl and four-legged beasts. Two other daughters of our science owe some of their inspiration to the votaries of a kindred but gentler craft.

Nevertheless, the main incentive to a philosophical study of natural history on the animal side cannot be attributed to hunting or to fishing as human arts. The inspiration was received rather from the older craft of 'killing for the pot,' in which man was an adept ere ever he began to herd or till, and before the conventional observance of hunting and angling precepts had become codified into those canons of conduct which the true sportsman treats as articles of faith. Even when the science of natural history has been under greatest obligation to the chase she has often been more indebted to the poacher than to the forest-warden. The debit and credit sides of the zoological account between the legitimate hunter and the

student of nature are evenly balanced. The zealous 'keeper' destroys what he regards as vermin with as much assiduity as he protects what he looks upon as game.

It is in the botanical account between the two that the natural historian stands more deeply indebted to the guardian of the royal waste, to whose policy and practice we owe the preservation of native plants whose existence now stands in jeopardy every hour. In the past we have been under a similar obligation to the woodward of the old 'free forest,' who restrained the enthusiasm of the mediæval logger and faggoter; in this case our science has repaid her debt by supplying inspiration and much of its technique to modern forestry. Nor should we forget those spiritual considerations that, outside the limits of Jewry and Christendom, have protected and sometimes still protect the contents of the sacred woods that man has left unfelled. In this particular case new needs have revived an old custom. Facilities for access to mountains and addiction to nature study have incidentally made it desirable to set aside sanctuaries for rare animals and plants. Our new and rather belated virtue would have had little scope for its exercise but for the effective if unconscious assistance of the rangers and woodwards of former days.

Until admonished by the result of some unwitting experiment, early man was liable to confuse noxious herbs and fruits with such as may be eaten with impunity. This risk has always been instant. The case of 'death in the pot' with which the prophet had to deal was not the first of its kind. The results of incautious patriotism which attracted attention a year ago, showed that it was not to be the last.

If proverbial philosophy be reliable, 'knowledge is power.' Whether this dictum be ever true of all knowledge, or always true of some, we need not consider here. From an early stage of man's progress it has certainly been true of knowledge of the natural history of hurtful things. Proficiency in this study formed part of the equipment of the 'medicine man' of his tribe. It was the material basis of the respect he inspired and of the influence, unassisted by physical prowess or political sagacity, that he was able to wield. The adept kept this knowledge for personal use or gradually imparted it to a 'sacred college' of trusted disciples, who profited, as a guild, by the exploitation of the dread and credulity of their neighbours and handed on to later neophytes the peculiar information they possessed.

Sometimes from this unpromising substratum higher truths evolved. But even in the natural sphere, with which we are chiefly concerned, important developments occurred. The laity came to recognize the principles and to suspect the practices of this privileged class. The 'witch-doctor' might still be feared; he ceased to be held in high regard. The name *φαρμακεία* became to the Greek a term of reproach, connoting a sorcerer or a poisoner with the implication that he who was the one must also

be the other. This may explain a certain reticence on the part of classical writers as regards banes. Their allusions suggest that a good deal was known about them, but that the topic was not a 'respectable' one.

There have, however, been other sequels to the popularization of this kind of knowledge. Both in the old world and in the new the possibilities were utilized in ways that have been deemed legitimate. Vegetable poisons are employed in regions so remote as Guiana and the Himalaya to render the missiles of blowpipe and bow more effective as weapons. In the best days of Athenian culture they were used as a means of inflicting capital punishment more seemly in Greek eyes than the modes of decapitation and strangulation which commend themselves yet to races less refined. African communities, whose polity embodies the logical application of socialist doctrine, have made an expert knowledge of poisons the scientific basis of an elaborate juridical system. Prior to the advent of our era the same knowledge enabled man to perform without discomfort to his fellows the always permissible and often imperative ceremony of suicide. Both before and since the promulgation of our more humane beliefs the discreet use of poison was a recognized method of settling private and public disputes. By degrees it was realized that in personal quarrels the practice is apt to be inconvenient, and the opinion gradually developed that addiction to the habit is not consonant with 'good manners.' But, if history may be trusted, the use of poison as a stereotyped weapon of statecraft has been stamped with the authority and approval of Kings and Popes. Half in earnest, a learned friend has suggested that the human record almost indicates that, given the opportunity, man has found it difficult to resist the temptation to poison either his neighbour or himself. At all events, few branches of natural history have been studied more assiduously or more successfully.

The study of poisons induced a search, just as assiduous, for antidotes. If this counter-study were less successful it was more widely diffused. The belief has been entertained at some period by most peoples, and is firmly rooted in the minds of many races still, that all cases of illness must be due either to witchcraft or to poison. The object therefore was to secure some specific whose presence on or in the person might counteract the effects of charm and bane. Sooner or later events showed that the ideal had not been attained, and man was driven to the supplementary expedient of administering an antidote after the real or supposed effects were manifest. If the result usually proved disappointing, there were occasional instances of apparent success. The substance administered sometimes was remedial against an ailment whose symptoms had been mistaken for the effects of a φάρμακον ἀνδροφόνον.

Gradual realization of the facts and the further discovery that even lethal substances, warily used, may be potent remedies, led to some re-orientation of view. The φάρμακα, while still

'drugs,' ceased to be necessarily 'banes,' and gradually became 'simples.' With this disappearance of the sinister connotation the once dreaded wizard of immeasurable power developed now into the physician so able as to earn apotheosis, anon into the humble herbalist who wandered from place to place in quest of 'salve and balm and bane.' The ancient satirist could not resist the temptation to remind the fashionable practitioner of his kinship with the vagabond 'culler of simples.' Grateful recognition of man's obligation to his physician was chiefly manifested, then as now, by those in that condition which is said to make even Satan contrite. Little in human experience is really new. The whimsical if irreverent dialogue between Hercules and Æsculapius, concocted eighteen centuries ago by one who just escaped being a 'maker of mercuries,' breathes the spirit of the controversies of our own generation between combatant and medical officers in our defensive services.

The social vicissitudes of the honourable 'mystery of medicine' do not, however, concern us here. What is of interest now is that the natural history of drugs, which has played such a part in physic, and has been one of the inspirations to our botanical pursuits, is a bye-product of man's early search for articles that, although not always good, may at least be eaten.

As the search for such edible wildings supplied the impulse that led man 'to grow corn and wine and oil,' so out of early woodcraft and simpling came his care for 'herbs of faith and grace.' Here, again, *ἔπειτα τὸ πνευματικόν*. Mystic groves hallowed man's high places, concealed his oracles and sheltered his shrines. Plants of faith typify his beliefs, indicate his kinship, and mark his last resting-place. The fate of Clytia; the recompense of Philemon and his spouse; later still, Slavonic appreciation of Teuton frightfulness, illustrate the supernatural side of this interest. On the natural side the attitude of modern medical practice towards many old remedies bespeaks a faith without foundation; the pages of the Pharmacopœia record cases of faith sustained.

This natural faith has stimulated man to acclimatize. From early times his garths gave harbourage to simples and sweet-savoured herbs. In classic days his enclosures held all the ancients knew that could be made to thrive. Renaissance pleasaunces found space for other stocks from beyond what had been the Roman pale. These plants of yesterday now welcome to our lawns and borders a countless kindred from lands more distant still. This 'wage of outland travel' includes denizens of every temperate clime from Chile to Cathay. The care of these æsthetic essences affords ample scope for man's skill in garden-craft and for the philosophical study of the form, nature and distribution of plants of grace. As the philosophical student knows, the literary interest thereby evoked often illustrates the truth of the adage that those who wish to get new ideas should

read old books, those who want to find old ideas may read books that are new. The cynical suggestion this adage conceals puts the philosophical student on his guard. He knows he is the heritor of ardent scholar-naturalists who castigated the recovered classics with such aid as scraps of Semitic erudition might afford.

The Arab naturalist of the XI. Century, like his Teuton successor of the XVI., based his system of nature on a Greek foundation. But he could not always consult the original source. His immediate authority often was some Aramaic commentary. The Arab may be pardoned if he considered such commentaries complete. They referred to a region which once beheld that singular marvel—a monarch who was also a student of natural history. The fame of that ruler was great, 'for he was wiser than all men.' 'He spake of trees—he spake also of beasts, and of fowl, and of creeping things, and of fishes.'

Nevertheless, when the Arab philosopher of Damascus felt satisfied as to the identity of the species under his observation with those intended by the Syrian translator of a Greek text, the Arab philosopher of Cordova remained less assured. Nor could either be certain that the species of an Aramaic scholiast were those of the Greek author.

The European scholar who, five centuries later, resumed the old task, had direct access to Greek authority. With naïve confidence he essayed to find the plants of Hellas in his native land. If Greek indications did not fit his species so much the worse for these indications. The finding of a new hemisphere did not at first shake western confidence. It was long assumed that a plant met with in one of the Indies ought to occur in both. We know now that this is not always the case, and this knowledge has made us realize that our best hope of understanding the plants mentioned by Greek authors comes from careful search within the limits of the old Byzantine provinces. This discovery has had another result. It has led the modern philosophical student to consult the ancient texts and has taught him that the outlook of the Greek naturalist was at times wonderfully like his own. This, however, is a matter which concerns the science of natural history as an entity free from such complications as any influence on or by the business of life may induce.

When that influence is taken into account we find that studies in the province of natural history whose care is the structure and functions of animals and plants as vital mechanisms, owe their origin to the practice of husbandry, and have in turn reacted beneficially upon that indispensable industry. They have done more than this; they have brought wild nature within the domain of rural economy by extending to the forest and the steppe those principles which find their practical expression in rotation, selection and breeding.

Studies in the province of natural history whose concern is with the habits, characters and occurrence of animals and plants

as organized beings have, on the other hand, derived their inspiration from human activities already in operation before any ordered conception of rural economy had been formed. Our work in this field has reacted equally beneficially on the efforts made by man to preserve a sound mind in a healthy frame and to find a satisfactory solution of the two great problems, what he should eat and wherewithal he might be clothed.

Sir HARRY VEITCH then moved:—"That the President be thanked for his excellent address, and that he be requested to allow it to be printed and circulated amongst the Fellows," which resolution, having been seconded by Mr. F. M. CAMPBELL, was put and carried with acclamation.

The President having acknowledged the vote of thanks, proceeded to address Dr. FREDERICK DU CANE GODMAN, F.R.S., reciting his services to the study of zoology, and handing to him the Linnean Medal in gold. He said:—

Dr. GODMAN,—

It is a source of much pleasure to me that it should be my fortune to serve our Society as the representative of its Council in conveying to you on their behalf the highest mark they can offer you of their appreciation of your services to the Science of Natural History.

Devoted from your youth to the cultivation of that Science, and especially to the study of Birds, you took a leading part, now sixty years since, in the foundation of the British Ornithologists' Union and in the establishment of that notable scientific journal, 'The Ibis.'

Shortly thereafter you joined your friend, the late Mr. Salvin, in his third expedition to Central America, and some years later you explored the Azores as a naturalist, and in 1870 put the results of your researches at the disposal of other workers. You then visited Madeira and the Canaries on the same errand, before commencing in 1876 those fruitful labours which have placed students of Natural History under so great an obligation to Mr. Salvin and to you.

The 'Biologia Centrali-Americana,' in which these labours are embodied, is a work which affords a survey of the fauna of the region, including the countries of Mexico and Panama with all the intervening territories, more complete than any such survey yet made of a similar tropical area. Since the inception of the task there have appeared, between the years 1879 and 1915, over three score volumes dealing with nearly forty thousand species of animals, about one-half of which have proved new to science. We owe to you, in conjunction with your colleague, the account of the Butterflies of the area, and to you alone the account of the Birds.

But your contributions to the text of this splendid undertaking form only a portion of your share in its prosecution. If, during the early half of the period, since 1879, over which its preparation has extended, the task of editing its contents and of taking steps to accumulate the requisite material were performed conjointly with Mr. Salvin, the whole burden of the gigantic task has, since 1898, been borne by you alone.

Great as this labour has been it does not exhaust the tale of the indebtedness of science to you. It still left you with time to pay visits, as a naturalist, to India and to Mexico. Your sagacity as occupant of the chair of an important Committee on Evolution, whose labours extended over a number of years, was gratefully appreciated and is warmly remembered.

As the Treasurer of the Ray Society and as a Trustee of the British Museum you have been able to do still more to promote the cultivation of the Science of Natural History.

Will you now, therefore, accept from me on behalf of my colleagues the Linnean Medal of the Society as a token of our deep appreciation of your labours and as a mark of our esteem and regard?

The recipient made a suitable acknowledgment in reply.

The General Secretary having laid upon the table the Obituary Notices of deceased Fellows which had been received from various authors, the proceedings terminated.

OBITUARY NOTICES.

The late Dr. HERMANN FRANZ BECKER was a Fellow for more than half-a-century, having been elected on the 21st June, 1866.

He was born in 1838 and educated for the medical profession, and took his M.D. degree at Jena, but symptoms of lung trouble caused him to leave his native country for Torquay, and subsequently in 1870 for Capetown, where he was appointed surgeon to the Bathurst and Alexandria districts. He ascribed his relief from the threatened pulmonary danger by his constant riding over this large district and the copious draughts of calabash milk at Kaffir kraals. In 1874 he removed to Grahamstown, where he resided during the rest of his life. Loyal to his country he took up out-patient work in 1914 after a few months of retirement, so as to release a colleague for field service, and continued this until 1st April, 1917; he took to his bed the next day, and soon after midnight of the 3rd April he expired.

Our late Fellow was twice married, and left a widow, but no family. A general practitioner for 55 years he enjoyed a great reputation locally, his spare time being given to entomology, shells, and algæ. His brother, Charles Otto Gustavus Becker,

was a surgeon in the British Army from 1854 until his retirement to Colchester; he was the father of Brigadier-General C. T. Becker. [B. D. J.]

A veteran has passed from our ranks in the person of Dr. ROBERT BRAITHWAITE at the age of 93. He came from a north Yorkshire family, his grandfather Robert Braithwaite, who married Sarah, daughter of Thomas Fishburn of Whitby, was a shipowner, and his father, of the same name, who married Sarah, daughter of Howden Major of Ruswarp, was of the same occupation, and a master mariner of the Merchant Service. Our late Fellow, the third Robert in lineal succession, was born at Ruswarp, a hamlet close to Whitby, by the River Esk, on the 10th May, 1824. His early education was derived at the school kept by Mr. Pudsey in Bagdale, and afterwards at that of Mr. Richard Breckon in Well Close Square. After leaving school he was apprenticed to Dr. Holtby, and in 1844 came south permanently. After acting as assistant for ten years to Dr. Jones at Dalston, he entered University College as a medical student, and in 1858 he became M.R.C.S. Eng. and L.S.A., beginning medical practice in Lambeth, at 59 Vauxhall Walk. He was elected Fellow of this Society on 5th February, 1863.

From his early days he had shown great devotion to botany, and this was continued in the intervals which a busy practice permitted. In 1869 he married Charlotte Elizabeth, the younger daughter of Nathaniel Bagshaw Ward, F.R.S. (1791-1868), the inventor of the Wardian case for the growth of ferns, and the transportation of plants overseas. Mr. Ward had removed in 1848 from Well Close Square to a house on the east side of Clapham Rise, where he developed a garden full of interesting plants, and upon his marriage Dr. Braithwaite (M.D. St. And. 1865) took up his residence there. The writer came to know him about this time, and well remembers some of the less common plants in the garden in rear of the house. *Trachycarpus excelsa* from Fortune's introduction flowered repeatedly, and the inflorescences were often shown in June at our meetings; *Taxodium distichum* grew on a tiny island, close by which the North American *Nuphar advena* flourished; *Allium triquetrum* from the Channel Islands was rampant, and many alpine plants now common in cultivation, such as *Saxifraga Geum* from Ireland, but at that date rarely found in gardens.

Dr. Braithwaite came under the influence of S. O. Lindberg (1835-89), and was his host in London when the Swedish bryologist came to the metropolis in 1872 and 1873, and he held fast to the views then imbibed; in 1889 he wrote an appreciative account of the Helsingfors Professor in the 'Journal of Botany,' xxvii. (1889) 147-148. He served twice on the Council of the Society—the first time, 1872-74, when that body was accustomed to meet at 3 in the afternoon and adjourn in less than an hour. This period covered the dramatic incident of Mr. Bentham's

retirement from the chair. The writer remembers overtaking Dr. Braithwaite when both of us were going to Burlington House, and his statement that nothing would happen that evening, 5th February, 1874, as the President had decided not to allow the disputed matter of the alteration of the Bye-laws to be reopened; matters, as is well known, fell out differently to that forecast. The second time was from 1889 to 1892, when he was a Vice-President during those three years. He joined the Royal Microscopical Society in 1866 and served as its President in 1892-3, his address being on "The Anatomy of Mosses." Other Natural History Societies which owed much to his active support were the Quekett Microscopical Club from 1865, as President 1872 and 1873; the Ray Society, and the South London Microscopical and Natural History Club, President 1873-75. Another Presidential Address was that given at York to the Yorkshire Naturalists' Union in 1895 upon "The Study of Mosses."

The two works upon which his reputation will rest were his 'Sphagnaceæ of Europe and North America' (London, 1880) and his still more important production, 'The British Moss-Flora,' which took him from 1880 to 1905 to complete, all the drawings being made by him for the lithographer to copy. This was finished six years after he had retired from medical practice in 1899, after the death of his wife. From Clapham he moved to Endymion Road, Brixton, where he delighted to receive visits from old friends who knew him in the palmy days before waning health and failing eyesight forbade close study of his beloved mosses. His herbarium is now in the Botanical Department of the Natural History Museum, Cromwell Road, and most of his books were disposed of before his death on the 20th October, 1917.

Those who corresponded or met with Dr. Braithwaite will not forget his ready help and kindness, especially to beginners. He has been described as not a great field-botanist, nor was he one, as a gatherer and distributor of large numbers of specimens, ticketed and numbered in series, but he enjoyed his trips to the Scottish Highlands and the one voyage to Norway, with its grounding of the 'Chimborazo' at night off the Norwegian coast. An eminent bryologist has dwelt upon Dr. Braithwaite's artistic preparation of specimens and his little regard or liking for varieties, a fact which may be due to his early training, when fine splitting in cryptogams especially was deprecated.

The Library has to thank our late Fellow for a splendidly bound copy of his 'British Moss-Flora,' his own especial copy, and for Schimper's 'Bryologia europæa' in 6 vols., 1836-55, which, by his desire, were both set aside for our library. We also owe to the kindness of Mr. H. N. Dixon that copy described by him in the 'Journal of Botany,' lvi. (1918) 24, of Schimper's folio, 'Versuch einer Entwicklungs-Geschichte der Torfmoose,' 1858, interleaved, with an English translation by our late Fellow facing each page of the original.

The writer has to thank Mrs. Horsley of Wellingborough and Mr. E. J. Heseltine of Hull, niece and nephew of Dr. Braithwaite, for many details of the foregoing sketch. [B. D. J.]

Dr. ETHEL LOUISE DE FRAINE, D.Sc., F.L.S. (1879-1918).—The death of Dr. Ethel de Fraine at Falmouth on March 25th, 1918, leaves yet another gap in the ranks of British botanists.

Born at Market Street, Aylesbury, on the 2nd November, 1879, Miss de Fraine became interested in Botany whilst in training for the teaching profession at Whitelands College, Chelsea. She proceeded to take the B.Sc. Honours degree, and thereafter devoted all her spare time to research, at first carried out at East London College in collaboration with Mr. (now Major) T. G. Hill. This resulted in a series of papers on seedling structure, and in 1910 her paper on the seedling structure of the Cactaceæ gained for her the degree of Doctor of Science (London). She became a Fellow of the Linnean Society on the 7th May, 1912, and was a life-member of the British Association. Her later research was carried on chiefly from University College, London, where she completed an important investigation on the rare fossil stem *Sutchiffia*. She frequently joined in the œcological expeditions organized from that college at first to Erquy (Brittany), and afterwards to Blakeney Point (Norfolk). She thus became deeply interested in salt-marsh plants, and soon applied her wide knowledge of plant anatomy to the intensive study of single genera, correlating the structural features with morphological and œcological problems. She had investigated some species of the genera *Salicornia* and *Statice*, and had already planned and partly written a book on the œcology and anatomy of halophytes, when her health broke down, and she entered upon the slow course of what proved to be her last illness.

In spite of her devotion to research, Miss de Fraine responded generously to the many claims on her time as lecturer and teacher. She was in succession Science Lecturer at Norwich Training College (1902-3), and at Whitelands College (1911-13). She was assistant lecturer in Botany at Battersea Polytechnic (1910-13), and at University College, Aberystwith (1913-14), and in 1915 she was appointed resident lecturer in Botany at Westfield College, becoming a Recognised Teacher of the University of London and a member of the Board of Studies in Botany.

Her energy and enthusiasm made her successful alike as teacher or investigator. Her personal character and her sound judgment made her a valuable colleague, and she was a most unselfish friend. She was cut off at the height of her powers, and her death is a loss to the scientific and also to the educational world.

Appended is a list of her publications.

HILL, T. G., and E. L. DE FRAINE.—The Seedling Structure of Gymnosperms.

Part 1. Ann. Bot. vol. xxii. 1908.

„ 2 & 3. Ann. Bot. vol. xxiii. 1909.

„ 4. Ann. Bot. vol. xxiv. 1910.

—— ——— The Seedling Structure of the Centrospermeæ. Ann. Bot. vol. xxvi. 1912, and vol. xxvii. 1913.

DE FRAINE, E.—The Seedling Structure of the Cactaceæ. Ann. Bot. vol. xxiv. 1910.

DE FRAINE, E., and HILL, T. G.—Influence of the Structure of the Adult Plant upon the Seedling. New Phytologist, 1912, vol. xi. pp. 319–332, 3 diag. and 9 text-fig.

DE FRAINE, E.—Note on a method of double staining microtome sections in the Ribbon. New Phytologist, 1913, vol. xii.

—— On *Medullosa centrofilis*, a new species of *Medullosa* from the Coal Measures. Rep. British Association, 1912, 678–9 and Ann. Bot. vol. xxviii. 1914.

—— Anatomy of the Genus *Salicornia*. Journ. of the Linnean Society, vol. xli. 1912, pp. 317–348, pl. 15–16, 14 text-figs.

—— Morphology and Anatomy of the Genus *Statice* as represented at Blakeney Point. Ann. Bot. vol. xxx. 1916. [E. M. DELF.]

CHARLES THOMAS DRUERY was born on May 22nd, 1843, and died at his residence in Acton on August 8th, 1917, after a long illness borne with exemplary patience.

It will probably be by his books and papers in connection with British Ferns and their Varieties that his name will be more particularly associated. In the later seventies he first commenced the cultivation of the varieties of British Ferns, which he pursued with enthusiasm to the end. As a Fern hunter and raiser he was perhaps second to none. The creation of the *Superbum* section in *Athyrium Filix-Femina* and the *Gracillimum* types in *Polystichum aculeatum*, which have received recognition at the hands of the Royal Horticultural Society, were themselves achievements of a high order and stand out as landmarks in the cult, whilst his many wild finds testified to the keenness and accuracy of his observation.

His discovery of what was afterwards termed Apospory first brought him into prominence as a keen scientific observer, and his Fellowship of the Linnean Society followed on the 19th March, 1885. His paper, “Observations on a peculiar mode of Development in the Lady Fern, *Athyrium Filix-Femina*,” was read before the Society on the 19th June, 1884, and his second paper, “Singular mode of reproduction in *Athyrium Filix-Femina* var. *clarissima*,” on the 20th November, led to the investigation by Prof. F. O. Bower, which was laid before this Society on the 18th December, 1884; it was the result of culture and investigation in the

Jodrell Laboratory at Kew from material supplied by Mr. Druery. The three papers appeared together in our Journal, Botany, xxi. (1885), 354-368, with two plates, and from this time dates the term "Apospory" to designate the cycle of reproduction by elimination of spore-formation.

His three works on British Ferns and their Varieties, viz., 'Choice British Ferns,' published in 1891, 'Book of British Ferns,' published in 1903, and 'British Ferns and their Varieties,' published in 1910, are well-known and valued.

He was one of the oldest members of the British Pteridological Society, of which he became President and for some years the Hon. Secretary. He founded and was the Editor of the Society's Gazette, and it was largely owing to his efforts that this Society has attained its present dimensions and influence.

For many years the deceased gentleman was a member of the Floral and Scientific Committees of the Royal Horticultural Society, whilst he was one of the first of the sixty recipients of the Victorian Medal of Honour. He was also one of the Founders and served on the Committee of the Horticultural Club since its inception, and was a regular attendant at its functions.

His contributions to the Horticultural Press were varied and extended over a great number of years. He was an accomplished draughtsman, and the illustrations in most of his works are productions of his own pencil. He was a prolific writer on Horticulture and Scientific subjects, an accomplished linguist, and the author of numerous works in poetry and prose. His numerous excursions into the realms of Poetry and Romance, however, though containing many striking passages, failed to meet with the general recognition they merited.

His remains were laid to rest in Acton New Cemetery on 11th August, 1917, in the presence of many of his relatives and old friends, whilst beautiful floral tributes from many absent friends and from the Societies with which he was associated testified to the universal respect and esteem in which he was held.

[W. B. CRANFIELD.]

HALL, KATE MARION, see page 61.

ERNEST DAVID MARQUAND, born in Guernsey on the 8th February, 1848, came of an old Norman family which had settled in the Channel Isles in the XII. Century. When he was quite young his parents migrated to New York, where he was educated. On his father's death the family returned to England, and Marquand was brought up to the law, starting life in a London solicitor's office. An enthusiastic lover of nature he did not care for city life, and in 1876 gave up business, and with his mother and brother retired to Netley on the borders of the New Forest, devoting himself entirely to the study of natural history in all its branches. He acquired an exceptionally extensive and accurate knowledge of plant and animal life, especially of the more minute creatures, for not content, as the field naturalist

often is, with a close acquaintance with their habits and outward appearance, he worked assiduously with the microscope, so that his knowledge was never superficial. In 1879 he removed to Penzance and became an important member of the little fellowship of naturalists which included the veteran botanists, John Ralls and William Curnow, with whom he became firm friends through their mutual interest in the Cryptogams. He afterwards lived for a short time at Exeter. 1887 and 1888 were two "wander years" with him, spent in travelling over a great part of Germany, Austria, Belgium, and Switzerland. Returning to live in his native island, he devoted the next few years to acquiring materials for his 'Flora of Guernsey and the lesser Channel Islands,' published in 1901, an admirable work and the one by which he is best known. In 1896 he married Miss G. E. Boley and lived at Richmond, working at the Kew Herbarium. In 1899 he removed to Alderney for four years, after which he lived successively at Guernsey, Paris, Bedford, Oxford, and Cambridge—the last four for the sake of his son's education—and finally in 1915 removed to Totnes where, on the 16th of May, 1918, he died at the age of 70.

He was for some time President of the Guernsey Natural History Society, Secretary of the Penzance Natural History Society, and corresponding member of the Société d'Archéologie d'Avranches and the Société des Sciences Naturelles et Mathématiques de Cherbourg.

He leaves a son, Mr. Cecil V. B. Marquand, an ardent naturalist, to whom we are indebted for the particulars of his life.

Marquand contributed many notes to Townsend's 'Flora of Hampshire.' With the exception of these and his own 'Flora of Guernsey,' his writings were for the most part confined to papers in periodical publications. About forty relate to the Flora and Fauna of the Channel Isles, and thirteen to those of Devon and Cornwall. He was a methodical worker, careful and thorough in all he did, a skilful manipulator as his beautiful slides of diatoms amply testify, an admirable correspondent, his letters being models of calligraphy and clear, terse, felicitous expression, while displaying the kindly spirit which actuated him in all his dealings. Though he led a quiet life, free from emulation and ambition, he was mentally and physically an active man. He was a great walker, and his wide and intimate knowledge of nature, which he was always ready to impart, his shrewd, witty remarks on things in general, and above all his broad sympathies, made him a delightful companion on a ramble. Those who, like the present writer, had the fortune to know him well, found behind the modest genial exterior a staunch friend.

He was elected an Associate on the 6th March, 1902.

[JAMES GROVES.]

An additional name on the Linnean Society's Roll of Honour is that of Lieutenant CUTHBERT ST. JOHN NEVILL, who was killed on the 18th April, 1918.

He was the elder son of Sir Walter Nevill, of Highbury New Park, London, born in 1889, and educated at St. Andrew's School, Eastbourne, and afterwards at Uppingham. He became a member of his father's firm on the Stock Exchange, and was a member of the Honourable Artillery Company when the war broke out. He volunteered for foreign service, and was sent to Egypt with his battery in 1915, and thence transferred to Aden. He was given a commission as Second Lieutenant in the Royal Field Artillery in 1916, and serving in France for eighteen months of continuous service he met his death as stated above, a severe loss to his battery as testified to by brother officers. In 1918 Mr. Nevill married Miss Eunice May Le Bas. He became a Fellow of this Society on the 17th November, 1910. [B. D. J.]

ETHEL SARGANT.—One of our most gifted and distinguished Fellows—the first woman to sit upon the Council—died on January 16th, 1918, at Sidmouth.

She was born at 45 Regent's Park Road, London, on the 28th October, 1863, the third daughter of Henry Sargant of Lincoln's Inn, having Mr. Edmund Beale Sargant (Director of Education for the Transvaal and Orange River Colony during the Boer War, and afterwards Education Adviser to the High Commissioner of South Africa for several years), Sir Charles Henry (Mr. Justice) Sargant, and Mr. Walter Lee Sargant, Head Master of Oakham School, as brothers. She was educated at the North London Collegiate School for Girls under Miss Buss, and at Girton College, Cambridge, which she entered in October 1881, and left in June 1885, having taken both parts of the Natural Sciences Tripos.

Ethel Sargant belonged to that class of amateurs to which Science owes so much—amateur, not in the sense of dilettante, but in the sense of one whose love of the work is so great that they are willing to pay to the full the toll of labour extracted from those who aspire to extend the boundaries of knowledge.

Her name will always be associated with the well-supported and well-reasoned theory of the Origin of Monocotyledons which she put forward in 1903. This contribution turned the scale in favour of the relative antiquity of Dicotyledons, which has been largely assumed by the majority of writers since that time. Her theory was based on her own extensive investigations of the anatomical structure of very young Monocotyledonous seedlings—a hitherto almost untouched field—which, in spite of the great variability met with, pointed to the existence of a common ground plan, which ground plan was not unlike that seen in the Ranunculaceæ among Dicotyledons. Further, a comparison of the habit of Monocotyledons with that of certain Dicotyledons led to the view that Monocotyledons were derived from a dicotyledonous condition by fusion of the two members correlated with the acquisition of a geophilous habit.

This conclusion Miss Sargant submitted to a close analysis of the salient features of Monocotyledons and Dicotyledons in a brilliant contribution entitled "A Reconstruction of a Race of Primitive

Angiosperms," which summarized the position by concluding that Monocotyledons and Dicotyledons must have had a common ancestor, and that there was strong reason to suppose that that ancestor was dicotyledonous and possessed other features such as secondary thickening now confined to the Dicotyledons among Angiosperms.

Her earlier researches into nuclear behaviour during fertilization and pre-fertilization stages indicate the same breadth of view and thoroughness of treatment.

Miss Sargent's general qualities and constructional ability were recognized by botanists in 1913, when she was invited to act as President of Section K of the British Association for the Advancement of Science at the Meeting held in Birmingham, being the first woman to hold that office.

Her end was undoubtedly hastened, if not brought about, by a strenuous piece of war work which she carried out, in spite of medical advice, as President of the Federation of University Women.

Many reasons conspired in general to keep her out of public life, even the public life of Scientists; nevertheless her genial personality was appreciated by all who knew her, and her great heart and lofty mind inspired the closest affection in those privileged to know her more intimately and who feel the world to be the poorer by her death. [E. N. THOMAS.]

WORTHINGTON GEORGE SMITH, who died at Dunstable on the 27th October, 1917, was less known to the majority of the present generation of Fellows than to their predecessors, owing to his having, for motives of health, removed to Bedfordshire more than thirty years ago.

He was born in London in 1835 and intended for an architect, studying under Mr. A. E. Johnson of Buckingham Street, Strand, and Mr. (afterwards Sir) Horace Jones, and became an expert draughtsman. Gradually he relinquished architectural drawing for plants, especially Fungi, and in 1865 he received the Banksian Medal in gold from the Royal Horticultural Society for coloured plant drawings, and the next year he wrote a paper on the corona of *Narcissus* for the International Botanical Congress which met in London in 1866. Twelve months later he lithographed two large sheets in colour of 'Edible and Poisonous Mushrooms' for Mr. Robert Hardwicke, the publisher, apparently his first publication. In 1869 he became associated with 'The Gardeners' Chronicle,' then under the editorship of Dr. M. T. Masters, who happened to see some of Mr. Smith's drawings designed to illustrate Goethe's 'Metamorphosis of Plants,' an association which lasted to the close of Mr. Smith's active life. At the same period he became an artist for the 'Floral Magazine,' subsequently its editor till 1876. Another volume 'Mushrooms and Toadstools; how to distinguish edible and poisonous Fungi' reached its second edition in 1875.

One well-known work of his, namely, his '*Clavis Agariciorum*,' was written for the Woolhope Club, and reprinted in the '*Journal of Botany*,' and as a separate pamphlet: it was based upon the coloration of their spores: in 1874 the Woolhope Club made him a presentation of plate for his labours on the higher fungi. To this club and its working members he was greatly attached, and the menu of each annual dinner was for many years enlivened by the humorous drawings from his pencil aptly fitting the occasion.

Shortly after his withdrawal to Dunstable he illustrated the genera and subgenera of the Hymenomycetes for Dr. Stevenson's '*British Fungi*,' and in 1891 he was responsible for the supplementary volume to Berkeley's '*Outlines of British Fungi*.' A task of long continuance was the series of water-colour drawings for the public gallery at the Natural History Museum, of the British larger Fungi, such as the Basidiomycetes, Discomycetes, and the Tuberoideæ: this occupied nine years, and supplementary work upon it continued for some years later, at different times.

The year 1893 was marked by his publication, the '*Guide Book to Sowerby's Models of British Fungi*' for the British Museum, he having previously painted the clay models themselves, now set up in cases in the public galleries. His services to gardening by his writings on Fungi were recognized in 1907 by the award of the Veitchian Medal by the Royal Horticultural Society; the year following he issued his '*Synopsis of British Basidiomycetes*' for the Trustees of the British Museum, and in successive years, '*Field and cultivated Mushrooms and their varieties*, and '*Poisonous or worthless Fungi often mistaken for Mushrooms*,' and in 1910, '*Edible and Poisonous Fungi*,' two large coloured sheets for exhibition at Cromwell Road. These works flowed readily from his long experience as a fungus-eater; in one case at least he gave a graphic account of poisoning symptoms following a rash experiment, which he published in the '*Journal of Horticulture*.'

Besides those of botanical import, our late Fellow was busy on archaeological pursuits all his life, and by the end of 1910 he had found 1043 palæolithic implements in the Thames Valley, and 800 in other districts; nearly all are in public or private collections. He died as previously stated at Dunstable, aged 82, and was buried in the cemetery there; he had been a Fellow of the Society since 5th March, 1868. [B. D. J.]

By the passing of Mr. RICHARD SPIERS STANDEN at the full age of 82, the Society has lost one of the diminishing number of all-round naturalists who, half-a-century ago, were numerous, but at the present time, when specialization has become necessary to the strenuous worker, are few.

He was born at Oxford, 11th October, 1835, and educated at King's College, London. He spent his life in business until forty-

five years of age, then he was able to give himself up to biological work at home and abroad. He spoke French, German, and Italian fluently, and late in life added Spanish and Norwegian to his accomplishments. An extensive herbarium of British plants was given by him in the year 1916 to the British Museum, Natural History, he having by then definitely devoted himself to Entomology. He lived in succession at Surbiton, Aylsham, Norfolk, Thorpe-le-Soken, Lindfield, and finally at Cupersham House, Romsey, where he died July 29th, 1917, leaving a widow, six daughters, and one son, Commissioner of Berar, in India. He was elected a Fellow on the 6th April, 1893, and was also a Fellow of the Entomological Society since 1889, and a Member of the South London Natural History Society, of which he was President in 1879.

Some of his other activities are enumerated in an appreciative memoir in 'The Entomologist,' 1917, pp. 263-4, from which many of the foregoing facts have been derived. [B. D. J.]

SIDNEY MILES TOPPIN is another loss to the Society arising from the war. An appreciative memoir is given in the Kew Bulletin, 1918, No. 4, pp. 156-157, from which the following particulars are taken.

He was the younger son of Major-General J. M. Toppin, formerly of the Royal Irish Regiment, and was born 12th June, 1875, at Clonmel, Ireland. He was educated at Clifton College and Gonville and Caius College, Cambridge; whilst preparing for a medical degree he was offered a direct commission in the Royal Artillery, and accepting it, he was gazetted in May 1900 and proceeded to India. After qualifying in Hindustani he was given charge of a mountain battery on the Afghan frontier. Stationed at Chitral for two years he spent his spare time in collecting and studying plants, a pursuit he continued when transferred to Burma. On obtaining his company he was appointed to Egypt, and coming home in 1914 he married just before war was declared. Instead, therefore, of leaving for India, he was sent to Ireland, where he formed a battery, and later to France. He saw much hard fighting, was mentioned in despatches, and for services at Loos was awarded the Military Cross. He was killed near Ypres on the 24th September, 1917, leaving a widow and infant daughter. His elder and only brother, Capt. H. S. Toppin, was killed in the battle of the Aisne on the 14th September, 1914, and his death was reported at first as that of our late Fellow.

Major Toppin's herbarium was bequeathed to the Royal Botanic Gardens, Kew; amongst them are 139 sheets of *Impatiens*, which were lent to and studied by Sir Joseph Hooker, G.C.S.I. He was elected a Fellow as recently as 2nd December, 1912. [B. D. J.]

The cause of Science and of genetics in particular loses a good friend in PHILIPPE LEVEQUE DE VILMORIN, who died in his prime last June. As a comparatively young man he was called on to

assume the post of chief responsibility in the famous firm of Vilmorin-Andrieux et Cie, founded by his great-great-grandfather, and of the intricacies of that complex business, so little understood by laymen, he acquired a mastery. A born cosmopolitan, loving travel and the varieties of human nature, he became to an unusual degree an international link between very dissimilar groups of people. He came into genetics as it were into his birthright. His grandfather, Louis de Vilmorin, was one of the first who had inklings of the truth as to the workings of heredity. By empirical observation Louis discovered that individual plants, not distinguishable to the eye, might be quite different in their genetic properties, and his expression *bons étalons** marks a small but definite advance on the complacent ignorance of the time. From this fragment of accurate observation there grew products of enormous economic significance, notably the effective improvement of sugar-beet. Industry has carried the work further, but as regards the sugar-beet nothing essentially new in principle has been added since Louis de Vilmorin's beginning.

It was at the Genetics Conference, called by the Royal Horticultural Society in 1906, that Philippe first came into practical contact with the Mendelian discoveries, and, having a prepared mind, he became an enthusiastic disciple. When the present writer stayed with him in 1909 many experiments were already well begun at Verrières, mostly still unpublished. Two of these produced results of considerable interest. The first led to the detection of a striking case of linkage in *Pisum* †, at a time when very few instances of such phenomena were known. The second set of experiments demonstrated the existence of an "unfixable" race of *short* wheat, having the remarkable property of throwing homozygous *tall* plants in every generation. In publishing ‡ an account of this family de Vilmorin suggested an interpretation, but there is probably more behind.

In 1912 he organized, almost single-handed, the fourth International Congress of Genetics, a delightful and most profitable gathering which did much to unite geneticists of all countries into a harmonious body. At the concluding meeting a permanent International Committee was set up at his suggestion to call future Congresses, but if a time ever comes again in which such an organization can meet, the bright spirit of our founder will be gone.

His strength lay in personal charm and the power of sympathy with all sorts of people, from which charm commonly springs. To very academic persons it seemed strange to see this brilliant man of the world who had shot big game and raced yachts in the best company, known everybody and seen everything, counting his seedlings or analyzing the points of the preposterous mongrel

* The essay in which this fact was first expressed was drafted in 1856.

† Proc. Roy. Soc. 1911, vol. B. 84,

‡ Journ. Genetics, 1913, iii,

puppies which he had bred at Verrières. But though the gayest in every society, delighting us all with his quick humour and flashes of *esprit gaulois*, he could work as well as the dullest. His accuracy was of the best kind. He had prodigious knowledge of cultivated plants, but if he did not know a thing he would say so, and with his vast professional acquaintance in the botanical and horticultural worlds he could generally give you a useful reference. Types recur and some day there may be others like him, but his qualities combine together very rarely, and it may be long enough before nature repeats the splendid production we knew as Philippe de Vilmorin. Born in 1872, he became a Fellow on 6th February, 1908, and died on the 30th June, 1917. [W. BATESON.]

EDWARD JOHN WOODHOUSE died of wounds received in action in France on the 18th December, 1917, at the age of 33.

Born in 1884, our late Fellow went up to Trinity College, Cambridge, whence he graduated in 1906, proceeding M.A. in 1911. In October 1907 he was appointed Economic Botanist to the Government of Bengal, and at once went out to India. After three years' work there he was appointed Principal of the Agricultural College of Sabour, Bihar and Orissa, while retaining his other appointment, and his services were of great value to the community, in one instance saving the Government at least four lakhs of rupees (= £26,500) by his treatment of a field pest.

At the outbreak of the war he was a captain in the Bihar Light Horse, and finally was allowed to join the Indian Army Reserve of Officers, and in February 1915 was attached to another cavalry regiment as signalling officer, acting adjutant, and officiating squadron commander.

He was elected Fellow on the 17th June, 1909. [B. D. J.]

The circumstances under which our late Librarian, EDWIN EPHRAIM RISELEY, died warrant an obituary notice. He was born at Abbots Ripton on the 15th February, 1889, the only son of his parents. On leaving school at the age of 15 he became Library Clerk to the Zoological Society, where he acquired an excellent knowledge of library methods and of zoological literature. In the spring of 1914 an assistant was wanted in our library, and Mr. Riseley was chosen for the post, and from the outbreak of war in that year the charge of the library and of our publications devolved upon him, for on the 31st July the then Librarian, August Wilhelm Kappel, started as usual to visit his relatives near Düsseldorf; four days later the war broke out. For some undisclosed reason he came back about the middle of August, and was permitted by the police to stay at Teignmouth, in Devonshire. Having been informed that Kappel, an enemy alien and not naturalized, had not been registered by the police, the officers of the Society remaining in Britain suspended Kappel from his functions, and when on the 1st September he presented himself for duty he was forbidden to enter. The President having returned from

Australia, where he had been with the British Association, a Council was held on the 15th October, and, on evidence laid before it, unanimously dismissed Kappel from the Librarianship. (He died on the 24th December, 1915, at Burges Road, East Ham.)

From the 1st September, 1914, therefore, Riseley was in charge of the library, although not definitely appointed until 21st January, 1915. He began energetically to improve the arrangement of the books, checked them with the catalogue, and set up card-catalogues for accessions, although he was unable fully to carry out his plans for overtaking the arrears which the previous Librarian had suffered to accumulate. He rapidly gained a knowledge of the botanical volumes in our possession, which, added to his attainments gained at the Zoological Society, made him an admirable officer of the Society. He enlisted in the 9th Battalion of the Rifle Brigade and, after training, was drafted to France, where he met his death by a shell on the 1st August, 1917. The regard in which he was held is testified by the memorial tablet of beaten copper fixed in the Library, with an inscription, of which the following is the draft:—

IN MEMORIAM

EDWINI EPHRAIMI RISELEY

nati a. d. XV Kal. Mart. A. D. 1889:

huius bibliothecæ

per annos 1914–1917 custodis:

quo tempore

omnium consensu officio studiose

diligenterque perfecto Sociis se commendavit:

vitam summa spe præditam inter arma

pro patria profudit

anno ætatis suæ vicesimo nono

Kal. Aug. A. D. 1917.

The following may be offered as a rough translation:—

In memory of Edwin Ephraim Riseley, born on the 15th February, 1889, in charge of this library from 1914 to 1917, during which period, by universal consent, he endeared himself to the Fellows by the energetic and able discharge of his duties; he laid down for his country a life of high promise on the 1st August, 1917, in the 29th year of his age.

The portrait accompanying this notice was taken soon after enlistment in 1916; we have to thank Messrs. Wakefields, of Chiswick, for giving permission for its insertion.

June 6th, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the Anniversary Meeting of the 24th May, 1918, were read and confirmed.

The report of the Donations received since the Anniversary Meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

The President announced that he had appointed the following as Vice-Presidents for the ensuing year:—Dr. W. BATESON, F.R.S., Mr. HORACE W. MONCKTON, Treas.L.S., Prof. H. G. PLIMMER, F.R.S., and Dr. D. H. SCOTT, F.R.S.

The Rev. Canon George Russell Bullock-Webster, M.A. (Cantab.), Mr. Heber Albert Longman, Mr. Arthur William Rymer Roberts, M.A., and Mr. William Wright Smith were elected Fellows, and Mr. Walter Watson, B.Sc. (Lond.), an Associate.

Mr. C. C. LACAITA, F.L.S., gave an abstract of his paper, "A Revision of some critical species of *Echium* as exemplified in the Linnean and other herbaria, with a description of *Echium judæum*, a new species from Palestine." He explained that this paper fell under five divisions:—(1) On five critical species of *Echium*, namely, *E. judæum*, mihi, *E. australe*, Lam., *E. Coincynamum*, mihi, *E. pyrenanthum*, Pomel, and *E. salmaticum*, Lag.; (2) The genus *Echium* in the herbaria of Tournefort, Jussieu, and Lamarck; (3) The *Echia* in Sibthorp's herbarium; (4) The Linnean species; and (5) The *Echia* of Miller's 'Gardener's Dictionary' of 1768.

Dr. O. Stapf, the General Secretary, and Mr. F. N. Williams engaged in a discussion, the Author replying.

Capt. A. W. HILL, F.L.S., showed a series of seedlings of *Cyclamen*. Normally only one cotyledon develops, the other remaining as a rudiment at the apex of the hypocotyl or tuber. If the lamina of the cotyledon be removed, new laminæ arise as outgrowths from the petiole just below the cut surface; but if the cotyledon with its petiole be removed, the rudiment of the second cotyledon is stimulated to develop into an assimilating organ. On removal of the lamina of this second cotyledon new laminæ will be formed from the inner edges of its petiole close to the apex exactly as is the case with the cotyledon proper. When plumular leaves are so treated no new laminæ are regenerated. Further cotyledon leaf-cuttings will produce roots from the base of the petiole, while plumular leaf-cuttings remain rootless.

Dr. Ethel N. Thomas, Dr. D. H. Scott, and Mr. W. C. Worsdell contributed further remarks, and Capt. Hill replied.

Messrs. ROBERT PAULSON, F.L.S., and SOMERVILLE HASTINGS, M.S., followed "On the Relationship between the Symbionts in a Lichen."

Mr. Somerville Hastings (visitor) having spoken, Miss A. Lorrain Smith strongly supported the views enunciated by the authors.

The proposed exhibition of Abnormal Apple-blossoms and Fruit was postponed by the Exhibitor at his request, on account of the lateness of the hour.

June 20th, 1918.

Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S., President,
in the Chair.

The Minutes of the General Meeting of the 6th June, 1918, were read and confirmed.

The report of the Donations received since the last meeting was laid before the Fellows, and the thanks of the Society to the several Donors were ordered.

Mr. Arthur William Rymer Roberts was admitted a Fellow.

Mr. Horace Norman Gray, Mr. Wilfred Edward Hiley, M.A.(Oxon.), and Sir Nicolas Yermoloff, K.C.B., K.C.V.O., were proposed as Fellows.

Mr. Lester Vallis Lester-Garland, M.A.(Oxon.), was elected a Fellow.

The first paper, by Prof. H. COUTIÈRE, "Les espèces d'Alpheidæ rapportées de l'océan indien par M. J. Stanley Gardiner" (Communiqué par M. le professeur J. Stanley Gardiner, M.A., F.R.S., F.L.S.), was briefly laid before the Meeting by the Zoological Secretary.

Mr. G. CLARIDGE DRUCE, F.L.S., exhibited 21 landscape drawings in sepia by Ferdinand Bauer, when accompanying Dr. John Sibthorp as artist during 1784-87. He remarked on the collection of original water-colour drawings of Greek plants which were made by Ferdinand Bauer. These, numbering 1000 large folio sheets, are still preserved in the library of the Botanic Gardens at Oxford. They were reproduced in 10 volumes in the sumptuous 'Flora of Greece,' which, through Dr. Sibthorp's

magnificent bequest of over £20,000, was published under the editorship of Sir J. E. Smith, Robert Brown, and Dr. Lindley. Not one of the 25 subscribers to it was living, it is said, when the last volume appeared in 1840, thirty-four years after the issue of the first volume. This book, therefore, is not only a very costly one, and excessively rare, but the excellence of the plates and text is worthy of the original drawings, which, a contemporaneous writer says—and the statement has never been seriously challenged—as works of art they are superior to anything of the kind in existence, and constitute one of the most valuable treasures of the University of Oxford. Prefixed to each volume is a small coloured view: (1) Mons Parnassus, 1806; (2) Mons Athos, 1813; (3) Mons Olympus, 1819; (4) Byzantium, 1823; (5) Hellespont, 1826; (6) Athens, 1827; (7) Corinth, 1830; (8) Mt. Athos from the Sea, 1833; (9) Phyeus, 1837; (10) Delphi, 1840.

Of the 141 drawings made by Bauer on this journey 131 are in the possession of Mr. Druce. They measure $17\frac{1}{2} \times 11$ inches, on boards $20 \times 14\frac{3}{4}$ inches. They are all named and numbered by Bauer in the sequence of the journey. He exhibited 21, *i.e.*, N. 28 Monastery of the Holy Trinity, Crete, 37 Isle of Amorgos, 38 Temple of Juno, Samos, 43 Mt. Olympus, 45 Seraglio Point, 49 and 53 Constantinople from Scutari, 58 Palace of Dulma Bakashee on the Bosphorus, 79 Rhodes, 85 Asian Village at Port Finica, 90 Monastery of Apocalypse, Patmos, 101 Temple of Theseus, 112 Mount Parnassus, 100 Athens, 115 Port Colomni, Sunium, 122 Negropont Bridge and Castle, 125 Landing Place, Negropont, 125 Iviri Convent, Mount Athos, 127 Mount Athos St. Anna Convent, 129 Salonica, 131 A Village near Salonica, 136 Corinth.

Mr. C. C. Lacaita commented on the drawings.

Mr. DRUCE then showed a series of British plants. (See p. 58.)

Mr. F. N. Williams, Mr. A. J. Wilmott, and Mr. T. A. Dymes discussed the plants shown, the exhibitor replying.

Sir N. YERMOLOFF, K.C.B., K.C.V.O., exhibited some lantern-slides representing a series of intermediate forms of the Diatom genera *Navicula* and *Cymbella*. (Communicated by Dr. A. B. Rendle, F.R.S., Sec. L.S.) (See Abstract, p. 56.)

A discussion followed, Dr. W. Bateson, F.R.S., Dr. E. J. Salisbury, and Mr. H. N. Dixon taking part, and the exhibitor replied.

Mr. E. J. COLLINS, F.L.S., read a communication on "Sex-segregation in the Bryophyta," of which the following is an abstract:—

Three cultures of *Funaria hygrometrica* were made in Marchal's nutrient fluid as follows:—

- A. Protonemata grown from the antheridia of a male "flower."
- B. Protonemata grown from the perigonal leaves of the same male "flower."
- C. Spores from a ripened capsule.

Submitted to the same cultural conditions, A and B produced a sward of plants with large discoid male "flowers" *only*, no sporogonia being produced at any time, C produced plants bearing male and female organs resulting in a dense crop of sporogonia.

It appears possible that vegetative development from structures borne on male and female branches respectively may, if a sex-segregation has actually occurred somatically, lead to the production of distinct male and female plants. If such is the case, the purity of the gamete in monoicous forms is secured by a somatic segregation in haploid tissue.

From other evidence it seems clear that the point at which segregation occurs is not necessarily fixed, but may be shifted backward in the life cycle until, occurring with sporogenesis, the dioicous habit of the gametophyte is established. In this way the dioicous condition might co-exist with the monoicous, or the monoicous condition might be accompanied by distinct male plants. Vegetative propagation from sex-segregated branches would also lead to the various sex-forms of any one species.

Mr. Bateson and Mr. H. N. Dixon contributed further remarks, and the Author replied.

Mr. A. O. WALKER, F.L.S., explained the method he had adopted at Ulcombe, Kent, amongst the school-children, with its success, eight common species being taken for reports on their flowering during three years, showing the remarkable difference between the dates of 1916 and 1917, when, in the latter year, the cold spring caused a delay of from four to six weeks in flowering. (See Abstract, p. 60.)

Mr. John Hopkinson, Dr. A. B. Rendle, and Dr. E. J. Salisbury spoke on the subject, Mr. Walker replying.

ABSTRACTS.

The Germination of *Iris Pseudacorus*, Linn., in Normal and Abnormal Conditions. By Lt.-Col. J. H. TULL WALSH, I.M.S., F.L.S.

[Read 1st November, 1917.]

THOSE who were present at the meeting held on the 30th of November, 1916, will remember that Mr. T. A. Dymes, F.L.S., told us rather a sad story about his experiences with the seeds of the Yellow or Water-Flag. He told us that "those [seeds] that fall on to the mud and remain there appear to perish from decay." "Seeds that have not sunk germinate on or near the surface of the water in the latter half of May." "The fate of those seeds, if any, that sink before germination has not yet been determined." I am not here to criticise Mr. Dymes. Under the conditions in which the seeds he used were expected to germinate, his results were correct. Seeds floated on deep water

in a large glass bottle placed by a window with a sunny outlook behave as described. But the conditions are not normal. *Iris Pseudacorus* is such a hardy plant, so well-known in England as a late spring and early summer ornament, that no description and no botanical details are necessary. That such marked changes should have taken place in the germination of the seeds of the Yellow Water-Flag without having attracted the attention of gardeners, seedsmen, and botanists seemed to me very strange—indeed, almost incredible. It is to Mr. Dymes that I owe the seeds which by their growth show, I think quite clearly, that *Iris Pseudacorus* has not been attempting any “mutations” and may still be trusted to produce seedlings in mud and shallow water—seedlings which are normal and healthy. If placed in the environment selected by Mr. Dymes, the floating seeds germinate; but if you will compare the seeds grown inside the house, grown in comparatively deep water, with those grown out-of-doors under normal conditions, I think you will agree with me that the former are neither healthy nor normal. The root-system is different and poorly developed, the leaves are pale and lacking in chlorophyll, and the plant is generally deformed. Of the seeds kindly given to me by Mr. Dymes (Dec. 1916) I placed eight (without any choice as to shape) in artificial pond No. I. This contained mud and weeds, was always kept saturated with water when that was necessary, and freed from superficial water when the bowl became filled by rain or snow. Pond No. I represented the mud at the margin of pond, marsh, or stream. Seven seeds were placed in Pond No. II. This contained the same amount of mud, but when the seeds were introduced they floated on the superficial water 2 inches deep. During the winter, with its rain, snow, and frost, these seeds sank and rested lightly on the mud. A little later six seeds were floated on water about 10 inches deep; the bottle in which they were placed has been standing on a table in my dining-room in front of a window facing south and south-west. Ponds I and II are in my garden.

The first signs of germination appeared on May the 19th, 1917, in the seeds floating in the bottle—a state of things due, no doubt, to higher temperature in the dining-room, and assisted by a position exposed to our intermittent sunlight. Three seeds germinated on that day, and the other three during the following week. These seedlings throw out a long root, as described by Mr. Dymes. The mass of fibrous roots given off by normal seedlings is quite absent. As these floating seedlings increase in size and weight, they sink. Two, caught in water-weeds, have given up the struggle and are dead. Two lie on the bottom, on a thin layer of mud: they will, I expect, die during the winter. Two are still to be accounted for: I show you these two as dried specimens.

On May the 26th seeds in Pond No. II, those lying on mud in shallow water, began to sprout. In course of time seven fine seedlings appeared in that pond. Lastly, the seeds in the mud of

Pond No. I began to germinate on June 3rd. Growth with these seedlings was, at first, slower than with those in the shallow water; but at the end of August the seedlings were as strong and healthy as those in Pond II. The little plants in Ponds I and II are now faded and have passed into a state of rest which will endure until next spring. I have removed and show you to-night dried specimens from each of the little ponds and from the bottles. A personal examination will tell you better than any words of mine the features which distinguish the normal seedlings from the "bottle seedlings."

Intensity and Direction of Light as Factors in Phototropism.

By HAROLD WAGER, D.Sc., F.R.S., F.L.S.

[Read 29th November, 1917.]

IN this communication an account is given of experiments made to determine the influence of the intensity and the direction of light in effecting phototropic responses in foliage leaves. In accordance with the teachings of physics we may assume that it is only the light absorbed by the photo-sensitive elements of a stimutable plant organ that is capable of setting up a phototropic stimulus. The light rays penetrate the tissues unequally but symmetrically. The extent to which this takes place can be shown by means of a simple piece of apparatus which may be called a *phytentoscope*.

By keeping the photo-sensitive region of a foliage leaf in a fixed position it can be shown that the orientation to light is determined by the varying extent to which the rays of light penetrate the photo-sensitive elements. The photo-sensitive elements of a foliage leaf probably consist of parenchymatous cells in the apical region of the leaf-stalk. Experimental evidence is brought forward to show that it is probably mainly in the cortex that the stimulus is received and transmitted. There is no evidence to show that the epidermis and pith take any large part in the process.

If the phototropic response is due to the physico-chemical changes set up by the light absorbed, then it follows that:—

1. The intensity of the physico-chemical changes depends upon the amount of light absorbed.
2. The extent to which the light is absorbed depends upon (a) the degree of penetration of the light, and (b) upon the selective absorption of the photo-sensitive elements.
3. The degree of penetration depends upon (a) the intensity of the light that impinges upon the stimulated region, and (b) upon the angle or angles at which the incident rays strike it.

We see therefore that the distribution of the physico-chemical activities in the photo-sensitive tissues is dependent upon both

intensity and direction of light, and since the direction of movement may be determined as the resultant of the varying physico-chemical activities in the whole of the sensitive region, we must conclude that both intensity and direction of light are necessary factors in the phototropic response.

Dr. WAGER then read his second paper entitled "Spore-coloration in the Agaricaceæ." He stated that the use of spore-coloration as a basis for the classification of the Agaricaceæ is artificial and imperfect. There is no clear line of demarcation between the various colours, and the designation of the colours in the text-books is very indefinite and unsatisfactory.

A beginning has, however, been made by members of the Mycological Committee of the Yorkshire Naturalists' Union to obtain more accurate records of spore-coloration in terms of a standard series of tints, such as that of the 'Code des Couleurs,' by Klincksieck & Valette (Paris, 1908).

We have already found—and this may be a fact of some considerable physiological interest—that, with one or two doubtful exceptions, all the spore colours so far standardized, whether pink, rusty, or purple, fall within the region of the less refrangible half of the spectrum. Spectroscopic examination also shows this.

It has been suggested by Buller that these colouring-matters may serve a useful purpose by screening off certain of the sun's rays from the living protoplasm.

If this is so, we ought to find some support for the hypothesis in the more abundant distribution of the coloured-spored species in the open and of the white-spored forms in the shade. On tabulating the records of habitats, it has been found that we get approximately:—

Black-spored forms: 24% occurring in the shade, 76% in the open.					
Purple	"	"	30%	"	"
Purple	"	"	70%	"	"
White	"	"	90%	"	"
White	"	"	10%	"	"

These figures support the hypothesis.

The pink-spored forms gave:—

34% in the shade, 66% in the open.

This is intermediate, as might have been expected, between the dark-spored and the white-spored species. The brown or rusty-spored forms, however, gave figures not quite so good, viz.:—

52% in the shade and 48% in the open.

These figures are only approximate, however, as they are compiled from a list of habitats which is probably not very accurately determined as regards light and shade.

Spore-coloration may, however, depend, partly at least, upon the kind of substratum on which the Fungi grow. It is significant, for example, that a large proportion of the black-spored forms grow upon dung, whilst the white-spored forms are found largely

upon the ground, frequently in soil rich in humus, and the rusty-spored forms largely upon rotten wood, old stumps, &c.

It would be instructive if careful records were made of spore-coloration in relation to the substratum as well as to light and shade.

Experimental Studies in the Specific Value of Morphological Characters in the Fungi. By WILLIAM B. BRIERLEY. (Communicated by Capt. A. W. HILL, F.L.S.)

[Read 21st February, 1918.]

IN all systematic treatment of the Fungi there is implied constancy of morphological characters, and particularly of the size and shape of the mature reproductive bodies or spores. An experimental study of the specificity of these criteria is in process, the work being carried out primarily upon the fungus *Botrytis cinerea*. This species is contained in the "*Polyactis*" group of the genus, and the species in this group are separated partly by reason of their different hosts, but more critically by minute differences in the branching and septation of the conidiophore and by the size and shape of the spore.

The published spore-measurements of *Botrytis cinerea* show a singular lack of uniformity (Marshall Ward on lily, $20-25\mu \times 15\mu$; Lorrain Smith on gooseberry, $8-11\mu \times 4-6\mu$; R. E. Smith on lime trees, up to 30μ ; etc.), and during the present investigation observations of the mode-spores of *Botrytis cinerea* growing upon different hosts, or separate infections of the same host, have shown that this variation in size and shape is a very marked feature of the fungus (on alder twig mode-spore $3\mu \times 2\mu$; on tomato fruit $10\mu \times 10\mu$; on onion bulb $6.5\mu \times 3.5\mu$; on lily $14\mu \times 10\mu$; etc.).

Pedigree cultures derived from single spores of the fungus growing upon different hosts were made, and these were used as the basis for all critical experimental work.

Botrytis cinerea developing upon living cabbage possesses a certain mode-spore. If this strain be inoculated into tomato fruits, the mode-spore is different in size and shape; and a third host produces a third mode-spore. The Fungus growing upon onion bulb shows a characteristic mode-spore, and if this strain be inoculated into cabbage, tomato, etc., the mode-spores differ from each other and from those produced by the first strain. Variations and combinations of these experimental inoculations were carried out with strains of different origin, the substrata being living plants, steamed tissues, and synthetic media, and the sizes and shapes of the mode-spores were recorded. It became evident that the species *Botrytis cinerea* is not "ungeheuer variabel" (Liudau), but that its apparent variability is due to the fact that it contains a great number of "elementary species" or

"Jordan's species" which are morphologically distinct. The size and shape of the spores of the "elementary species" show two kinds of variation: (1) *normal variation*, which is always present upon whatever host or substratum the Fungus develops, and the range of which is characteristic of the elementary species; and (2) "*modal variation*," which is the variation in the size and shape of the mode spore, and is directly and constantly induced by the particular substratum. In nature the "elementary species" are usually found upon particular hosts, but they readily attack other plants and, when growing saprophytically, are omnivorous.

The size and shape of the spores of the Fungus growing in nature are therefore not morphological constants but resultants of the strain of the fungus and the substratum upon which it is developing; and the only method of critically identifying the particular elementary species present is to isolate it in pure culture and obtain its "*modal variation*" upon a series of standardized media.

The presence of modal variation in the size and shape of the spores has been ascertained in three species of *Penicillium* and one species of *Stysanus* which have been investigated, and it is suggested that it may be of general occurrence in the Fungi.

Exhibition of lantern-slides representing a series of intermediate forms of the Diatom genera *Navicula* and *Cymbella*, by Sir N. YERMOLOFF, K.C.B., K.C.V.O. (Communicated by Dr. A. B. RENDLE, F.R.S., Sec.L.S.)

[20th June, 1918.]

THE lantern-slides will show a series of closely connected forms, so gradually and continuously passing into one another, that it would seem possible to group them into one synthetic genealogical evolutionary line of descent. A fossil Diatom from the freshwater deposit of Monmouth, in the American State of Maine, lying approximately at the latitude of the Great Canadian Lakes—this deposit probably dating from before the Glacial periods,—may be considered as the primordial ancestral form from which the whole series has derived during the post-Glacial ages. This parental form is *Navicula monmouthiana forma genuina*.

The idea of grouping together into lines of genealogical descent closely connected intermediate forms of Diatoms, which, in the enormously crowded Systematics of Diatomaceæ, may otherwise stand rather far apart, has been hinted at by Cleve. The present attempt at what may be called Synthetic Integration of intermediate forms has been undertaken in further pursuance of Cleve's idea. The work mainly consisted in finding, between firmly-defined species, the connecting links.

The exhibited forms come from two European and two American localities. They are all freshwater. Some are firmly established species, others intermediate forms, which may be given so-called hyphenated nominations, stating the initial species from which they seem to start and the final species to which they seem to tend.

The lantern-slides were shown in the following sequence, corresponding to the line of their evolutionary descent :—

Navicula monmouthiana forma *genuina*. American fossil.

Navicula monmouthiana, with first slight variation towards the *Stodderi* form. American fossil.

Navicula monmouthiana-Stodderi. An American living hyphenated form.

Cymbella Stodderi. American living.

Cymbella Stodderi-angustata. American living.

Cymbella æqualis. European living.

Cymbella angustata. European living.

Encyonema gracilis. American fossil.

Encyonema scotica. European living.

Cymbella delicatula. European living. Also living in America.

Cymbella gracilis-Cesatii. American living. A hyphenated form.

Cymbella Cesatii. European living.

Cymbella microcephala. European living.

The detailed examination of the above evolutionary ladder suggests the hypothesis that the large, simple, and homogeneous ancestral form *Navicula monmouthiana* was a primordial species adapted to the more uniform conditions of life on the planet during the pre-Glacial epochs, and that the *Cymbellæ* which subsequently evolved from it are smaller, more complex heterogeneous forms, gradually derived from *Navicula monmouthiana* under the influence of quite different and more varied conditions of life and climate, which established themselves on the earth after the Glacial epochs, at least under the latitudes between 40 and 60 degrees North.

A similar trend of changes from larger and less varied forms to smaller heterogeneous ones has affected the whole of organic life after the Glacial extensions towards the South. No wonder that the same trend has wrought similar changes also in Diatoms.

Several authors admit that *Cymbellæ* are degenerated *Naviculæ*. This seems plausible, only the term "degenerated" can hardly be used as we cannot know the direction of Evolution as a whole. The most we can say is, that the immediate result of evolutionary changes consists in a better adaptation, in the struggle for existence, to changed conditions of life.

Exhibition by Mr. G. CLARIDGE DRUCE, of New British Plants.

[20th June, 1918.]

403. *SAGINA SCOTICA*, Druce, in Bot. Exch. Club, Rep. for 1911-12, p. 14. Ben Lawers, Perth, Aug. 19th. 1911.—Also found in the counties of Argyll, Inverness, Forfar, Aberdeen, and Banff.

Distinguished from *S. saginoides* by its smaller capsule, more creeping growth, and from *S. procumbens* by its larger and longer petals, which are mainly pentamerous.

414. *SPIRGULARIA ATHENIENSIS*, Aschers. & Schwein. Beitr. Fl. Æthiopica 267, 1867.—First found in the British Isles at St. Heliers, Jersey, 1906, see Bot. Exch. Club, Rep. for 1906, p. 196. Since found at Par, Cornwall, by Dr. Vigurs, and at Aldeburgh, Suffolk.

Distinguished from *rubra* by the broadly-triangular stipules and absence of central rosette, and from *salina* by the smaller capsules and pyriform seeds. Widely distributed on the Mediterranean coasts and abundant about Athens.

1126. *ANTHRISCUS SYLVESTRIS*, Hoffm. var. *LATISECTA*, Druce, in Bot. Exch. Club Rep. for 1916-17, p. 412.—This form is more frequent in the Midlands and Southern Counties.

In Scotland, where the species itself is much less frequent, the prevailing plant has narrow leaf-segments, this (*opus cit.*) is the var. *ANGUSTISECTA*. Petersen (Dansk. Bot. Arkiv for 1915) figures 59 different sorts of leaves, which he arranges in 16 groups. Plants with leaves between the two extremes named above are frequent in France and have been noticed in Cornwall. *Angustisecta* I have not yet seen south of Derbyshire, nor *latisecta* south of Lancashire and Cheshire.

1172. *HEDERA HELIX*, Linn., var. *SARNIENSIS*, Druce, in Bot. Exch. Club Rep. for 1912-13, p. 163.—In Guernsey and Jersey this broad-leaved ivy is frequent, even in the barren branches the segments are broader than in the common British form. Miss I. M. Roper has since found a form closely approaching it at Chewton Keynsham, N. Somerset.

Var. *BOREALIS*, Druce, l.c. In Skye, both at Glen Sligachan and Glen Brittle, a plant with very narrow and smaller leaves occurs, and it has been since found in Silverdale, the limestone area of Oxfordshire, etc.

The diminution of leaf-surface in the northern habitats of the *Hedera* and *Anthriscus* is somewhat remarkable.

1663 (10). *SCORZONERA HUMILIS*, L. Discovered near Wareham, Dorset, by Mrs. and Master Noel Sandwith in 1914, see Bot. Exch. Club Rep. for 1915, p. 202.—I have visited the habitat, and have no doubt that it is indigenous there, growing as it does on the Continent, and with similar associates and in the same kind of situation.

Its wide continental distribution is entirely in favour of its being a native plant in England. I have gathered it on the opposite coast of France, at La Touquet; there it was accompanied by *Senecio spathulifolius*.

1646. *TARAXACUM BALTICUM* Dahlst. forma, teste Dr. Dahlstedt.—For several years I made an unsuccessful search along the eastern coast from Kent to Northumberland. Then I unexpectedly met with it in a small bit of fen-land in Oxfordshire, an area which has several other local species.

It occurs in Sweden, Northern Germany, Denmark, Russia, and Finland. It is allied to *T. paludosum*; the very narrow, almost simple early leaves are a striking feature, and remain constant in culture.

1931. *EUPHRASIA SUECICA*, Murb. & Wetts. See Wetts. Mon. 297, 1896.—This was gathered by me in June 1906. Not being satisfied with the suggested names of British critics I submitted it to Dr. Lindman, who suggested the above name, which was confirmed by Dr. Wettstein. See Bot. Exch. Club Rep. for 1912, p. 169.

1933 (2). *EUPHRASIA FENNICA*, Kihl., Exmoor, Somerset, 1890; Clifden, Galway, Sep. 1911.—These specimens have been determined by Dr. Wettstein. See Bot. Exch. Club Rep. for 1912, p. 169.

2326. *ORCHIS INCARNATA*, L., var. *DUNENSIS*, Druce, in Bot. Exch. Club Rep. for 1915-16, p. 212.—Sands of Barry, Forfar, R. H. Corstorphine. A very beautiful plant, near to the brilliantly coloured variety from Dorset, Hampshire, Lancashire, etc., which I am describing as var. *pulchella*. The clever painting is exhibited by Miss C. G. Trower.

2776. *GLYCERIA MARITIMA*, Wahl., var. *HIBERNICA* (Druce, under *festuciformis*, in Bot. Exch. Club Rep. for 1909-10, p. 482).—*G. festuciformis*, Praeger, not of Hayne. Chichester Harbour, Pagham, etc., W. Sussex, Hayling Isle, S. Hants, Strangford Lough, Co. Down. Closely allied to the Adriatic *festuciformis*, but neither identical with it, nor with *G. maritima* var. *Foucaudii* Hackel, yet sufficiently distinct from the ordinary forms of the polymorphic *maritima* to deserve varietal distinction.

The distinguishing characters are the caespitose or sub-caespitose growth, the greater height, luxuriance, longer panicle, etc. Dr. Stapf agrees that this is not the true *festuciformis*. Sub-var. *AMETHYSTINA*, Pagham, Chichester, W. Sussex. Hybrid *MARITIMA DISTANS*, with both parents. Pagham, Sussex, and Hayling Island, S. Hants, 1917.

Unless otherwise specified the plants were discovered by the writer.

Phenological Observations in an Elementary School.

By A. O. WALKER, F.L.S.

[20th June, 1918.]

DURING the last three years the senior pupils of Ulcombe School have undertaken to observe the first appearance in flower of certain common wild flowers well known to all of them, small prizes being given to those who are the first to find one of these in bloom near their own home.

The Parish of Ulcombe, Kent, forms a rough parallelogram about 6 miles long by 1 mile wide, extending lengthwise from south about 100 ft. above sea-level on the Weald Clay to about 500 ft. above sea-level on the Lower Greensand ridge on the north. The population in 1911 was 649 and is entirely agricultural.

The number of children (boys and girls) who took part in the competition was 20 to 25 out of a total of a little over 100 scholars. Each of the children was supplied with a book in which they had written the rules of the competition and the names of the plants to be noticed, each plant on a separate page. On the first finding of a plant the child entered the date, the exact place of finding, and the number of examples in bloom up to 6, after that "m" or "many." A specimen was then gathered and taken to the school to be checked by the schoolmaster or mistress (Mr. and Mrs. A. Robinson), without whose co-operation, most heartily and willingly given, the competition could not have been carried out.

The following plants were chosen as being very common and well known to the children. The dates of the first observation of one or more plants in flower are given:—

	1915	1916	1917
1. <i>Tussilago Farfara</i>	Feb. 22	Feb. 1	Mar. 17
Coltsfoot.			
2. <i>Cardamine pratensis</i>	Feb. 17	Jan. 29	Mar. 28
Cuckoo Flower, Milkmaids.*			
3. <i>Anemone nemorosa</i>	Mar. 11	Mar. 5	April 2
Wood Anemone.			
4. <i>Stellaria Holostea</i>	Mar. 9	Feb. 16	April 28
Great Stitchwort.			
5. <i>Erysimum Alliaria</i>	April 8	Mar. 31	April 28
Jack-by-the-Hedge.			
6. <i>Galeobdolon luteum</i>	Mar. 9	Mar. 20†	May 1
Yellow Dead Nettle.			
7. <i>Scilla nutans</i>	April 1	Mar. 18	April 22
Bluebell.			
8. <i>Anagallis arvensis</i>	May 17	May 1	June 2
Scarlet Pimpernel.			

As a control I give the flowering in my garden of *Narcissus* "Sir Watkin," of whose flowering I have kept a record since 1903, viz.:—1915, April 16; 1916, March 23; 1917, April 27. The earliest record is March 10, 1913.

* Local name.

† Exceptional. The next plants observed in flower were on April 8 and April 15.

[Owing to the illness of the author, this obituary notice could not be inserted in the usual place.]

KATE MARION HALL.—The story of the late Kate Marion Hall, F.L.S., F.Z.S., who was for years Curator of the Stepney Borough Museum, and one of the founders of the School Nature Study Union, is the comparatively uneventful story of a woman whose life was full of interest and beauty, because of her intense love of Nature; and who devoted herself during the best years of her life to sharing the pleasure her knowledge and studies gave her, with the men, women and children of crowded Whitechapel.

Born in August 1861, Miss Hall was the daughter of the late Mr. Harry Hall, of Newmarket, the well-known animal painter, and of Ellen Payne his wife. She was educated at Highfield School, Hendon, under Miss Metcalfe. After her father's death in 1881 she came to London and she attended classes at University College, but did not take a degree because she never succeeded in mastering Latin. Later on, her love and sympathy for working people took her to Toynbee Hall, where she began an association with Canon and Mrs. Barnett that lasted for many years. About 1893 she was appointed Curator of the Borough of Stepney Museum at Whitechapel—the first woman to hold such a position in England. It was on the 1st June, 1905, that she was elected a Fellow of the Linnean Society, of which she was very proud. She remained at Whitechapel until 1909, when she retired to New Place, Lingfield, and died there on April 12, 1918.

Brought up by a father whose love for animals must have been an inspiration and an education to her, the girl from her earliest days displayed the power of exact observation that was later on to make her such an admirable instructor. "I cannot remember the time," she writes in her delightful book 'Nature Rambles in London,' "when I did not know the names of common trees. We lived with these trees, year by year, and season by season. Under the finest plane I have ever seen I read my story books, and when wearied with these, amused myself by discovering what intruders had taken shelter beneath the flakes of its bark."

She was fortunate in being able to pass on to all the grown up people and children who loved to visit the Museum, something of her own enthusiasm for the fascinating story of plant and animal life. The collection—which developed from the Toynbee Hall collection—received on transference to its new home some valuable additions, including rare specimens from New Zealand which had been presented to Queen Mary, then Duchess of York, when she visited that country. Mr. Sydney Hall, the artist of the 'Graphic,' had accompanied the royal party on that tour, and it was perhaps through him that the Duchess became interested in his sister's work. Years before the idea proved so welcome at the British Museum, Miss Hall had instituted "museum talks," which were much appreciated by the visitors. She gave many weekly lectures; and Lord Avebury was one of

many eminent men who were delighted to go down to Whitechapel to lecture to her little gatherings.

Side by side with her work at the Museum, Miss Hall carried on another enterprise that to-day gives the greatest pleasure to thousands of children in the neighbourhood. It would have pleased her to know that in the summer holidays of 1918, 300 children have every day visited the Nature Study Museum at St. George-in-the-East. When she first went to Whitechapel, this building was a disused mortuary. She cast longing eyes on it, and never rested until in spite of all opposition, and with the help of friends who realized her vision and the value of her dreams, it was handed over to be transformed into an Aquarium. It stands in the church gardens behind the Cable Street School—a fairy house in an oasis. Miss Hall's idea was to have only living things there, and that classes should come regularly from the schools to study with their own eyes. Two of its greatest attractions were the sea-anemone tank, and the wonderful observatory bee-hive with glass walls through which one could study all the organization and achievement of the bee community. The bees, which became famous far beyond the neighbourhood, and which fed on honey from the garden flowers, syrup from shops, or else spoil from the sugar ships at the docks, used to attract working men from all parts of London. They would stand for hours, watching and philosophizing; and they miss the hive sadly since war conditions have necessitated its removal.

All that Miss Hall saw here of the pleasure and interest which the Aquarium gave her child visitors, strengthened her deep conviction that Nature Study should have its place in every school, and that the important thing was that children should learn by their own observation rather than from books. As Secretary of the School Nature Study Union, she did a great deal by her two books, 'Nature Rambles in London' and 'Common Animals,' and by numerous papers, to bring about the revolution that is taking place in this direction; and she gave her whole time and personal energy to the task of teaching all the children she could reach. Not content with her average of forty or so lectures a week, she used in her leisure hours to take parties of children—especially parties of boys—for rambles in the parks, woods, and open spaces about London, showing them what seasonal changes were taking place in the trees, and teaching them to know the birds and their habits and to recognize the flowers.

There was nothing sentimental in her passionate love for Nature; she could not have been so successful with the children had there been. She had the true scientific mind. She was keen, and critical, and above all she was practical. If she walked through London parks in winter "on tenterhooks of anticipation," watching for the first signs of spring, she was also noting how badly the trees were injured by unskilful treatment; and she was longing that the squares might be thrown open to the

children. And then back to Whitechapel she would go, to advise people who could not walk in the parks how to manage their window boxes, and thus bring a little bit of Nature into their dingy homes.

It is certain that in consequence of Kate Hall's life and work many thousands of children in London and elsewhere have learnt to note with intelligent eye the promise of spring, the fulfilment of summer, the decay of autumn, and the sleep of winter. Her work, therefore, unselfish and untiring, has yielded and will yield a harvest of continuous good.

[BEATRICE HARRADEN.]

ADDITIONS AND DONATIONS

TO THE

LIBRARY.

1917-1918.

Albert, Honoré Charles (*Prince de Monaco*). Résultats des Campagnes scientifiques, etc. Fasc. xlviii.-li.

4to. *Monaco*, 1916-17.

XLVIII. Annélides Polychètes pélagiques provenant des campagnes des yachts *Hirondelle* et *Princesse-Alice* (1885-1910). Par **PIERRE FAUVEL**.

XLIX. Chétognathes provenant des campagnes des yachts *Hirondelle* et *Princesse-Alice* (1885-1910). Par **L. GERMAIN** et **L. JOUBIN**.

L. Crustacés décapodes (Macroures marcheurs) provenant des campagnes des yachts *Hirondelle* et *Princesse-Alice* (1885-1915). Par **E.-L. BOUVIER**.

LI. Pycnogonides provenant des campagnes scientifiques de **S. A. S. le Prince de Monaco** (1885-1913). Par **E.-L. BOUVIER**.

Armstrong (Sydney Frederick). British Grasses, and their employment in Agriculture. 8vo. *Cambridge*, 1917.

Arnold Arboretum. Publications.

No. 6. **TUCKER (ETHELYN MARIA)**. Catalogue of the Library. Volume II. Subject Catalogue with Supplement to Volume I. 4to. *Cambridge, Mass.*, 1917. **The Director**.

Arrow, G. J. See **Blanford (W. T.)**. The Fauna of British India, etc. Coleoptera.

Arvet-Touvet (Casimir). Hieraciorum præsertim Galliæ et Hispaniæ Catalogus Systematicus. Préface de l'Abbé H. Coste.

8vo. *Paris*, 1913. **Tagart Bequest**.

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BENEFACCTIONS.

List in accordance with Bye-Laws, Chap. XVII. Sect. 4, of all Donations of the amount or value of Twenty five pounds and upwards.

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The Rt. Hon. Sir Joseph Banks, Bt.

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Professor Thomas Bell, £105.

1857.

Subscription portrait of Prof. T. Bell, P.L.S., by H. W. Pickersgill, R.A.

Thomas Corbyn Janson: two cabinets to hold the collection of fruits and seeds.

Pleasance, Lady Smith: Correspondence of Sir J. E. Smith, in 19 volumes.

1858.

Subscription portrait of Nathaniel Bagshaw Ward, by J. P. Knight.

Richard Horsman Solly, £90 after payment of Legacy Duty.

Subscription for removal to Burlington House, £1108 15s.

Biography of Carl von Linné, and letters to Bishop C. F. Mennander, presented by Miss Wray.

Dr. Horsfield's Javan plants, presented by the Court of Directors of the Hon. East India Company.

Dr. Ferdinand von Mueller's Australian and Tasmanian plants, including many types.

1859.

Books from the library of Robert Brown, presented by J. J. Bennett, Sec.L.S.

Robert Brown: bequest of two bonds given up, £200.

1861.

Subscription bust of Robert Brown, by Peter Slater.

Collection of birds' eggs, bequeathed by John Drew Salmon, F.L.S.

1862.

The Linnean Club: presentation bust of Prof. Thomas Bell, by P. Slater.

1863.

Subscription portrait of John Joseph Bennett, by E. U. Eddis.

1864.

Beriah Botfield, Esq.: Legacy, £40 less Duty.

1865.

Executors of Sir J. W. Hooker, £100.

George Bentham, Esq.: cost of 10 plates for his "Tropical Leguminosæ," Trans. vol. xxv.

1866.

Dr. Friedrich Welwitsch: Illustrations of his 'Sertum Angolense,' £130.

1867.

George Bentham, Esq.: General Index to Transactions, vols. i.-xxv.

Royal Society: Grant in aid of G. S. Brady's paper on British Ostracoda, £80.

1869.

Carved rhinoceros horn from Lady Smith, formerly in the possession of Carl von Linné.

1874.

Subscription portrait of George Bentham, by Lowes Dickinson.

George Bentham, Esq., for expenditure on Library, £50.

1875.

Legacy from James Yates, £50 free of Duty.

" " Daniel Hanbury, £100 less Duty.

1876.

Legacy of the late Thomas Corbyn Janson, £200.

" " " Charles Lambert, £500.

George Bentham, Esq.: General Index to Transactions, vols. xxvi.-xxx.

1878.

Subscription portrait of John Claudius Loudon, by John Linnell.

Subscription portrait of Rev. Miles Joseph Berkeley, by James Peel.

1879.

Rev. George Henslow and Sir J. D. Hooker: Contribution to illustrations, £35.

1880.

The Secretary of State for India in Council: cost of setting up Dr. Aitchison's paper, £36.

1881.

George Bentham, Esq., special donation, £25.

The same: towards Richard Kippist's pension, £50.

Portrait of Dr. St. George Jackson Mivart, by Miss Solomon; presented by Mrs. Mivart.

1882.

Executors of the late Frederick Currey: a large selection of books.
Subscription portrait of Charles Robert Darwin, by Hon. John Collier.

The Secretary of State for India in Council: Grant for publication of Dr. Aitchison's second paper on the Flora of the Kurru Valley, £60.

1883.

Sir John Lubbock, Bt. (afterwards Lord Avebury).

Portrait of Carl von Linné, ascribed to M. Hallman.

Philip Henry Gosse, Esq.: towards cost of illustrating his paper, £25.

Royal Society: Grant in aid of Mr. P. H. Gosse's paper, £50.

Sophia Grover, Harriet Grover, Emily Grover, and Charles Ehret Grover: 11 letters from Carl von Linné to G. D. Ehret.

1885.

Executors of the late George Bentham, £567 11s. 2d.

Subscription portrait of George Busk, by his daughter Marian Busk.

1886.

A large selection of books from the library of the late Dr. Spencer Thomas Cobbold (a bequest for a medal was declined).

Sir George MacLeay, Bt.: MSS. of Alexander MacLeay and portrait of Rev. William Kirby.

1887.

William Davidson, Esq.: 1st and 2nd instalments of grant in aid of publication, £50.

Francis Blackwell Forbes, Esq., in aid of Chinese Flora, £25.

1888.

The Secretary of State for India in Council: Grant in aid of publication of results of the Afghan Boundary Delimitation Expedition, £150.

Dr. J. E. T. Aitchison, towards the same, £25.

Trustees of the Indian Museum: Mergui Archipelago report, for publication in Journal, £135.

Dr. John Anderson, for the same, £60.

Wm. Davidson, Esq.: 3rd and last instalment, £25.

Sir Joseph Hooker: (1) Series of medals formerly in possession of George Bentham; (2) Gold watch, key, and two seals which belonged to Robert Brown.

1889.

Bronze copy of model for Statue of C. von Linné, by J. F. Kjellberg; presented by Frank Crisp, Esq.

1890.

The Secretary of State for India in Council: Grant for Delimitation Expedition report, £200.

Oak table for Meeting Room, presented by Frank Crisp, Esq.

Subscription portrait of Sir Joseph Dalton Hooker, K.C.S.I., by Hubert Herkomer, R.A.

Executors of the late John Ball, Esq.: a large selection of books.

An anonymous donor, £30.

Colonel Sir Henry Collett, K.C.B., towards the publication of his Shan States collections, £50.

1891.

Subscription portrait of Sir John Lubbock, Bt. [Lord Avebury], by Leslie Ward.

George Frederick Scott Elliot, Esq., towards cost of his Madagascar paper, £60.

1892.

Dr. Richard Charles Alexander Prior: for projection lantern, £50.

1893.

The Executors of Lord Arthur Russell: his collection of portraits of naturalists.

Electric light installation: cost borne by Frank Crisp, Esq.

1894.

Algernon Peckover, Esq.: Legacy, £100 free of Duty.

Miss Emma Swan: "Westwood Fund," £250.

1896.

Clock and supports in Meeting Room, presented by Frank Crisp, Esq.

1897.

William Carruthers, Esq.: Collection of engravings and photographs of portraits of Carl von Linné.

Royal Society: Grant towards publication of paper by the late John Ball, £60.

Subscription portrait of Professor George James Allman, by Marian Busk.

1898.

Sir John Lubbock, Bt.: Contribution towards his paper on Stipules, £43 14s. 9d.

Royal Society: Contribution towards F. J. Cole's paper, £50.

" " " " Murray & Blackman's paper, £80.

" " " " Elliot Smith's paper, £50.

" " " " Forsyth Major's paper, £50

1899.

Alfred Charles William Harmsworth, Esq. [afterwards Lord Northcliffe]: Contribution towards cost of plates, £43.

Royal Society: Contribution towards Mr. R. T. Günther's paper on Lake Urmi, £50.

1901.

Hon. Charles Ellis, Hon. Walter Rothschild, Frank Crisp, Esq., F. D. Godman, Esq., and the Bentham Trustees: The Correspondence of William Swainson.

Royal Society: Contribution towards Mr. F. Chapman's paper on Funafuti Foraminifera, £50.

Prof. E. Ray Lankester: Contribution towards illustration, £30 5s. Portrait of Dr. St. G. J. Mivart, presented by Mrs. Mivart.

1903.

Royal Society: Contribution toward Dr. Elliot Smith's paper, £50.

Legacy from the late Dr. R. C. A. Prior, £100 free of duty.

Mrs. Sladen: Posthumous Portrait of the late Walter Percy Sladen, by H. T. Wells, R.A.

B. Arthur Bensley, Esq.: Contribution to his paper, £44.

1904.

Royal Society: Grant in aid of third volume of the Chinese Flora, £120.

Frank Crisp, Esq. (afterwards Sir Frank Crisp, Bt.): Cost of Supplementary Royal Charter.

The same: Bulliard (P.). *Herbier de la France*; *Dictionnaire*; *Histoire des plantes vénéneuses*; *Champignons*, in 10 vols. Paris, 1750-1812.

1905.

Royal Society : First grant in aid of Dr. G. H. Fowler's 'Biscayan Plankton,' £50.

Executors of the late G. B. Buckton, Esq. : Contribution for colouring plates of his paper, £26.

1906.

Royal Society : Second grant towards 'Biscayan Plankton,' £50.

Subscription portrait of Prof. S. H. Vines, by Hon. John Collier.

Royal Swedish Academy of Science : Copies of portraits of C. von Linné, after Per Krafft the elder, and A. Roslin, both by Jean Haagen.

1907.

Royal University of Uppsala : Copy by Jean Haagen of portrait of C. v. Linné, by J. H. Scheffel (1739).

Royal Society : Third and final grant towards 'Biscayan Plankton,' £50.

The Trustees of the Percy Sladen Memorial Fund : First grant towards publication of Mr. Stanley Gardiner's Researches in the Indian Ocean in H.M.S. 'Sealark,' £200.

1908.

Prof. Gustaf Retzius : Plaster cast of bust of Carl von Linné, modelled by Walther Runeberg from the portrait by Scheffel (1739) at Linnés Hammarby : the bronze original designed for the façade of the new building for the Royal Academy of Science, Stockholm.

Miss Sarah Marianne Silver (afterwards Mrs. Sinclair), F.L.S. : Cabinet formerly belonging to Mr. S. W. Silver, F.L.S.

1909.

The Trustees of the Percy Sladen Memorial Fund : Second grant towards publication of Mr. Stanley Gardiner's Researches in the Indian Ocean in H.M.S. 'Sealark,' £200.

Prof. James William Helenus Trail, F.R.S., F.L.S. : Gift of £100 in Trust, to encourage Research on the Nature of Proto-plasm.

1910.

Royal Society : Grant towards Dr. G. H. Fowler's paper on Biscayan Ostracoda, £50.

Sir Joseph Hooker : Gold watch-chain worn by Robert Brown, and seal with portrait of Carl von Linné by Tassie.

Prof. J. S. Gardiner : Payment in aid of illustrations, £35 0s. 6d.

Sir Frank Crisp : Donation in Trust for Microscopical Research, £200.

The Trustees of the Percy Sladen Memorial Fund : Third grant towards publication of Prof. Stanley Gardiner's Researches in the Indian Ocean, £200. (For third volume.)

1911.

The Trustees of the Percy Sladen Memorial Fund: Second Donation towards the publication of the third volume on the Indian Ocean Researches, £70.

The same: First Donation towards the fourth volume, £130.

1912.

The Indian Government: Contribution towards the illustration of Mr. E. P. Stebbing's paper on Himalayan *Chermes*, £46 15s. 2d.

The late Mr. Francis Tagart, £500 free of Legacy Duty.

The late Sir Joseph Dalton Hooker, O.M., G.C.S.I., £100 free of Legacy Duty.

The Trustees of the Percy Sladen Memorial Fund: Second Donation towards the publication of the fourth volume on the Indian Ocean Researches, £140.

The same: First Donation towards the fifth volume, £60.

1913.

Royal Society: Grant towards Dr. R. R. Gates's paper on Mutating *Oenotheras*, £60.

Sir Frank Crisp, Bt., Wallichian Cabinets, £50.

The Trustees of the Percy Sladen Memorial Fund: Second Donation towards the publication of the fifth volume, £200.

1914.

Royal Society: Grant towards Miss Gibbs's paper on the Flora of British North Borneo, £50.

Miss Foot: Cost of illustration of her paper on *Euschistus*.

The Trustees of the Percy Sladen Memorial Fund: Third Donation towards the fifth volume, £10.

The same: First Donation towards the sixth volume, £190.

1915.

The Trustees of the Percy Sladen Memorial Fund: Second Donation towards the sixth volume, £80.

Miss Foot: Cost of second paper on *Euschistus*, £32 10s.

Royal Society: Donations towards the cost of a paper by Mrs. Arber, D.Sc., £40.

The same: towards paper on Utakwa River plants by Mr. H. N. Ridley, C.M.G., F.R.S., £50.

Miss Marietta Pallis: Instalment of cost of her paper on *Plav*, £30.

Thomas Henry Riches, Esq.: Dr. A. R. Wallace's library on Natural History.

Sir Frank Crisp, Bt.: New shelving for Wallace's Volumes.

1916.

- Mr. E. Heron-Allen : Contribution to cost of paper on Foraminifera of N.W. Scotland, £44.
- Messrs. H. Takeda and C. West : Contribution towards the illustration of their paper, £40.
- Royal Society : Contribution towards the illustration of two papers by Prof. Dendy, £40.
- The same : Contribution towards Mr. Swynnerton's paper on Form and Coloration, £70.
- The High Commission for the Union of South Africa, per Dr. J. D. F. Gilchrist, for the illustration of his paper on *Jasus Lalandii*, £30.
- Miss Marietta Pallis : Balance of cost of her paper on Plav, £90 16s. 6d.
- Sir Frank Crisp, Bt. : Phototyped copy of Dioscorides from the 'Codex Aniciæ Julianæ' at Vienna.

1917.

- British Ornithologists' Union, etc. : Contribution towards cost of Mr. H. N. Ridley's paper, £20.
- The Royal Society : Contribution towards the printing of Mr. C. F. M. Swynnerton's paper on Protective Coloration, £75.
- Sir Frank Crisp, Bt. : 'Lindenia,' Ghent, 1891-1901. 17 vols. sm. fol.
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CORRESPONDENCE

BETWEEN

CARL VON LINNÉ

AND

C. RIJK TULBAGH,

GOVERNOR OF THE DUTCH COLONY

OF THE

CAPE OF GOOD HOPE.

INCLUDING A LIST OF 203 SPECIMENS
SENT IN OR ABOUT THE YEAR 1767
TO UPSALA.

Forming a Supplement to the Proceedings of the
Society for the 130th Session, 1917-18.

LONDON:

PRINTED FOR THE LINNEAN SOCIETY,
BURLINGTON HOUSE, PICCADILLY, W. 1,
BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

1918.

LINNÉ-TULBAGH CORRESPONDENCE

IN POSSESSION OF THE LINNEAN SOCIETY,

BEING A FIFTH CONTRIBUTION

TOWARDS THE

HISTORY OF THE LINNEAN COLLECTIONS.

BY

BENJAMIN DAYDON JACKSON, PH.D.

THIS fragmentary correspondence is notable for the interesting list of seed-plants and bulbs sent by Tulbagh to Linné, with numbers which are quoted in the herbarium, and are made clear from the catalogue which follows. The said catalogue is artlessly phrased, and I have therefore not translated it literally, but have extracted all the points likely to be wanted when the dried plants are inspected. Linné alludes to the plants in his diary, thus:—"Tulbagh, Governor of the Cape of Good Hope, made me a present of above 200 of the rarest plants that grow there, all put up with great care, besides a number of roots and bulbs alive, for the purpose of being planted in the garden" [at Upsala]. *Cf.* Proc. 1887-88, p. 21.

Tulbagh's governorship lasted from 1751 to 1771, when he died; it was memorable for the prosperity of the Colony under his enlightened and fatherly administration, in great contrast to the periods before and after his time.

The list of plants was named up by Linné, and the Linnean names are printed in *Italic type*. The names written by Linné were evidently done on the first examination of the plants; many have no attempt at a determination, others only referred to genera, and many more were changed before publication—these are amongst those with "(sic)" appended. About 25 per cent. were new, and as such published in the second *Mantissa*

(1771), having evidently reached Linné too late for the first Mantissa (1767). Linné's handwriting here is exceptionally hard to make out.

We find allusions to letters from Linné in the two from Tulbagh, which are all that are extant in our possession.

The notes are artless but somewhat verbose. Thus No. 1 reads: "Is found in sandy veld growing 2 feet high, brings forth a red flower in May," which is compressed to the essentials: "Sandy veld, 2 ft., red fl. in May"; No. 136, "Is found on the Roode Zand Mountain [a locality two or three miles west of Tulbagh, in the division of the same name], whole thickets 6 feet high, flowering in October," here printed as: "Roode Zand, entire thickets, 6 ft., fl. October"; and once more, No. 139, "Is found in constant rains, creeping along the ground, with a yellow flower," here shown as: "Rainy season, creeping, fl. yellow." The collector's shrewdness of observation is shown with reference to No. 193, where he remarks that he had not seen it in flower. It is *Schizoa pectinata*, Sw., the only fern in the list. The fertile fronds are in the Linnean herbarium.

A few words in Cape Dutch occur, such as "veld," = field, but generally applied to the open country of South Africa. "Vlei" occurs once or twice; it means the level ground by a watercourse, sometimes a pool, on the margin of a stream. "Pers" must mean peach-coloured or lilac, for the flowers so described are not in any way compressed.

Governor Tulbagh to Professor C. v. Linné.

[*Translation.*]

NOBLE AND MOST LEARNED SIR!

The letter which you have done me the honour to write under date of the 16th October, 1761, has duly reached me, and I have had the pleasure to learn from it that the bulbs and plants which Herr Brill took hence have given you satisfaction; wherefore I now enclose for transmission a keg with 36 kinds of flower-bulbs, and a small basket with 20 sorts of flower-seeds, to which I have added a little case of the various insects of the country, such as one may collect oneself, which I trust may not be found unwelcome. Each and all have been given to the charge of Herr Carl Ekeberg,

commanding the Swedish Company's ship 'Finland,' so I doubt not that they will arrive in good condition. Further I would state that last year I sent to you a box of silver-tree seed [*Leucadendron argenteum*] under the care of Herr Sandberg of the Swedish ship 'Rikstander.'

Meanwhile I commit you to the protection of the Allhighest [=Almighty], with all respect,

Your obedient and very humble servant,

From the Castle, Cape of Good Hope,
25th April, 1763.

C. R. TULBAGH.

P.S.—The Chief Supercargo Christian Tham has, on sailing, taken charge of the above-named trifles.

NOBLE AND MOST LEARNED SIR!

Whereas I have now a suitable opportunity by means of the Swedish homeward-bound ship 'Crownprince Gustaf' to send you a book of dried plants and herbs, together with some seeds and bulbs, in the hope that some at least may please you, having, by the courtesy of Mr. Supercargo Gril, the assurance that they will reach you under his care.

Whilst in May last, 1768, I had the pleasure of receiving your friendly letter of the 23rd November, 1765, neither Messrs. Captain Ekeberg or Koenig is known to have returned this way, so that I do not know whether you have before this, become aware of this fact.

Herewith I commit you to the protecting care of the Allhighest, and remain, with ready willingness to serve,

Noble and most learned Sir,

Your very humble servant,

C. R. TULBAGH.

Cape of Good Hope,
20th March, 1769.

List of Plants sent [1769?].

No.

1. Sandy veld, 2 feet high, red flowers in May. *Blaeria ericoides.*
2. Sea-coast, 1 ft. high, yellow flower in May. " Omissa."
3. Sandy veld, 12 to 18 inches high, white flower in May. *Selago polystachya.*
4. Amongst high mountains, 1 ft. high, fl. in May. *Xeranthemum canescens.*
5. Sandy veld, 1 ft. high, yellow fl., May, seeds in pods. *Liparia graminifolia.*
6. Sandy veld, 6 in. high, fl. in May. *Erica corifolia.*
7. Sandy veld, 2 ft. high, yellow fl. in May. *Inula pinifolia.*
8. On sandy hillocks, 5 ft. high, named by natives " Flower bunches " because nearly always in flower. — ?
9. In thickets, 4 ft. high, fl. yellow in May; when past flowering has short leaves, and seeds like onions. *Passerina capitata* [?] — ?
10. Sea-coast, fl. yellow in May.
11. Sandy fields, 3-9 ft. high, fl. white in May. *Gnidia oppositifolia.*
12. Sandy veld, 2 ft. high; sticky red flowers in May. *Erica muscosa.*
13. Sandy veld, 2 ft. high, fl. in May. *Erica Plukenetii.*
14. Mountains, 3 ft. high, white fl. in May. *Phylica radiata.*
15. Sandy veld, 2 ft. high, white fl. in May. *Phylica ericoides.*
16. River-sides, 6-8 ft. high, fl. red, in July, fruit winged. *Indigofera ericoides.*
17. Sandy veld, 4 ft. high, fl. in May. *Erica monspeliensis.*
18. Sides of streams, 2 ft., yellow fl. in May. *Othonna parviflora.*
19. Sea-shore, 8 ft., fl. white, fragrant, in May, seed with black spots when ripe. " *Femina-vidua.*"
20. Sea-shore; called " Gersebos " by the natives; thick roots; are uprooted for firewood. *Euonymus Colpoon.*
21. Among mountains in muddy places; the underneath part of fl. is blackish, and upper part yellow; May. *Antholyza* [sp.].
22. Mountain regions, 2 ft., yellow fl. in May. *Erica Petiverii.*
23. Sea-shore, 6 ft., lilac fl. in May. *Atropa solanacea.*
24. Sandy veld, 3 ft., fl. in May. *Phylica cernula.*
25. Mountains, used as brooms for sweeping out houses, fl. May. *Restio capensis.*
26. Sea-shore, under bushes, fl. May. *Arctotis tenuifolia.*
27. River-banks, 8 ft., fl. yellowish, in May, ripe seed in a bunch. *Rhus lucida.*
28. Sandy veld, 2 ft., fl. May. *Protea pallens.*

- No.
 29. Mountains, in deep gorges, 9-10 ft., fl. October. *Aspalathus genistoides*.
 30. Level banks of rivers, fl. yellow in October. *Arctotis amphyllifolia*.
 31. In rainy season, 3 ft., fl. in October. *Pteronia camphorata*.
 32. Sandy flats, fl. November. *Pharnaceum incanum*.
 33. Mountains, 2 ft., yellow fl. in August. *Aspalathus carnosia*.
 34. Sandy veld, 2 ft., strongly scented, white fl. in August. *Drosera rufa*.
 35. Gorges in mountains, creeping on ground, fl. October. *Aspalathus laxata*.
 36. Shady places by streams, 3 ft., fl. October. *Iva absinthoides*.
 37. Side of mountain streams, 18 ft., fl. August. *Erica pentaphylla*.
 38. Level veld, 8 ft., blue fl. in October. —
 39. High up the mountains, 2 ft., white fl. in October. *Erica albens*.
 40. Mountain rocks, 8 ft., fl. August. *Osteospermum corymbosum*.
 41. Rock hillock, 3 ft., fl. August. *Aspalathus canescens*.
 42. New Roode Zand gully, 5 ft., yellow fl. in October. *Crotalaria amplexicaulis*.
 43. Mountains, 8 ft., fl. October. *Anthyllis capensis*.
 44. Level sandy veld, fl. December. *Cineraria purpurata*.
 45. Roode Zand mountains, 3 ft., whole thickets, fl. August. *Leucadendron totta*.
 46. Watery places on mountains, 2 ft., fl. in August. *Indigofera sericea*.
 47. Sandy veld, 2 ft., fl. August; by handling has lost its leaves, which are very small. *Erica revirescens*.
 48. Shady spots among mountains, fl. September. *Chironia stricta*.
 49. Muddy places on mountains, fl. September. *Seriphium corymbiferum*.
 50. By streams, strongly scented, glutinous, 6 in., fl. in August. *Osteospermum spinosum*.
 51. By streams, 2 ft., with lilac fl. in October. *Echium laevigatum*.
 52. Deep gorge in mountains, 8 ft., fl. September. *Crotalaria* —
 53. By streams, 12 ft., fl. August. [Illegible] 5-andrea.
 54. Shady river-banks, 2 ft., fl. October. *Indigofera psoraloides*.
 55. Muddy places by streams, 5 ft., fl. August. *Calendula punctata*.
 56. Sandy veld and by dry river-banks, 6 in., fl. September. *Spartium sepianum*.
 57. Mountains, 4 ft., fl. October. *Geranium zonale*?
 58. Shady places, 8 ft., woody stem as thick as a man's arm, fl. September. *Crotalaria perforata*.
 59. Sandy veld, fl. September. *Leyssera gnaphaloides*.
 60. By streams, 3 ft., yellow fl. in October. *Psoralea aculeata*.

No.

61. Sandy veld, 2 ft., fl. August.
62. High mountains by watering-places, 3 ft., light red fl. in July. *nov. genus.*
63. New Roo de Zand gully, 8 ft., forming a big bush, fl. November. *Leucadendron* 136.
64. Mountains, 1 ft., fl. October. *Selago Prunastri.*
65. Marshy places, 3 ft., fl. November. *Grubbia*
[*rosmarinifolia*, Berg.]
66. By streams flowing from mountains, 4 ft., white fl. in October.
67. Mountains, 2 ft., fl. in August, sticky. *Erica cubica.*
68. On the Witsenberg, on Roo de Zand, 2 ft., fl. September. *Leucadend.* *roseum*?
69. Level muddy places, 3 ft., fl. September. *Erica tubiflora.*
70. Dassenberg, fl. August. *Gnaphal. discolor.*
71. Sea-shore, 4 ft., fl. October. *Gnaphal. crassifolium.*
72. Mountains, in permanent thickets, climbing to 5 ft., fl. October. *Senecio elegans.*
73. Sea-shore on sand dunes, 2 ft., fl. August. *Selago tomentosa.*
74. By streams from mountains, 5 ft., fl. in August. *Pencea* [*marginata*?].
Zygophyllum sessilifolium.
75. Sea-coast, 3 ft., fl. October. *Xeranth. sesamoides.*
76. Sandy veld, fl. September. *Aspalathus carnosa.*
77. Sandy hillocks, 3 ft., fl. September. *Gnaphal. teretifol.*
78. Sandy veld, 3 ft., fl. August. *Protea Serruria.*
79. Sandy veld, Cape Flats, fl. September. *Drosera uniflora.*
80. Sandy veld, fl. September.
81. Hot spring on Swarteberg, 5 ft., fl. in August. *Schoenus capensis.*
82. Marshy vlei [level by streams] where the natives drink water in chest complaints, fl. September. *Osmites asteroides.*
83. Gully in mountains, 8 ft. shoots hanging from rocks, white fl. in August, followed by berries like those of asparagus.
84. Sandy veld, creeping on ground, in September. *Leucad. Serraria.*
85. Mountains, 2 ft., fl. September.
86. Shady thickets, 3 ft., fl. November. *Chrysocoma comareua.*
87. Mountains, fl. September. *Xeranth. speciosissimum.*
88. Sandy veld, fl. August. *Erica umbilicata.*
89. Sea-shore, in thickets, 3 ft., fl. August.
90. Sandy veld, 2½ ft., fl. September. *Sophora genistoides.*
91. By streams, 6-7 ft., fl. October, followed by small pods [capsules]. *Polygala myrtifolia.*
92. Sandy veld, fl. September. [Illegible] *suffruticosa.*
93. Mountains, 2½ ft., white fragrant fl. in August.
94. Clayey ground, fl. October. *Indigofera tenuifolia.*
95. By streams, 8 ft., fl. September.

- No.
 96. Sandy veld, 2 ft., sweet-smelling yellow fl. in September.
Cornus ———
97. Sandy veld, creeping along the ground, fl. August.
Gnaphalium coronatum.
98. Dry, parched places, 6 in., blue. *Echium fruticosum.*
99. By streams, 7-10 ft., fragrant fl. in August. *Sophora biflora.*
100. Mountains, 6 in., white fl. in September. *Buchnera cernua.*
101. Sandy veld, creeping along the ground, 4-5 ft., fl. November.
Gnaphalium repens.
102. High mountains, between the velds, fl. September.
Crassula coccinea.
103. Sandy hillocks, 5 ft., yellow fragrant flowers in July.
Gnidia simplex.
104. Sandy veld, 2 ft., fl. August. *Phyllica dioica.*
105. Sea-side, amongst bushes, scrambling to 4 ft., white fl. in May.
Cliffortia tomentosa.
106. Along the mountains, 3 ft., juice milky when cut, fruit as large as a hen's egg, filled with fine down and black seeds.
Asclepias dilatata.
107. Sandy veld, 1 ft., white and red fl. in May; its red fruits are eaten by the natives. *Polygala spinosa.*
108. Sandy veld, climbing up bushes, fl. May; its fruit is a pod filled with black seed and fine down.
Ceropegia angustifolia.
109. Sandy veld, fl. May. *Zygophyllum spinosum.*
110. Sandy veld, fl. May. *Gnidia radiata.*
111. Mountains, creeping, sea-green fl. in May, followed by small berries. *Lotus prostratus.*
112. Sandy veld, 2 ft., fl. August. *Phyllica ericoides.*
113. Sandy veld, 8 ft., fl. August. *Clusia alaternifol.*
 [=alaternoides].
114. Sea-coast, 6-7 ft., fl. May. *Salvia colorata.*
115. Sandy veld, fl. May. *Erica viscaria.*
116. Sandy veld, 2 ft., fl. August. *Indigofera sericea.*
117. Sandy veld, fl. June. *Hartogia imbricata.*
118. Sandy veld, fl. May. *Erica perfoliata.*
119. Sandy veld, 6 in., creeping, fl. June. *Protea strobilina.*
120. Sea-coast, 5 ft., fl. June. *Osteospermum monilif.*
121. Along the mountains, fl. August. *Indigofera divaricata.*
122. Lion-flower, along the mountains, fl. the entire year.
Phlomis Leonurus.
123. Mountains, small white fl. in May.
Antherospermum aethiopicum.
124. Mountains, fl. October. *Polygala mitior* [?].
125. Damp level by rivers, 4 ft., fl. August. *Othonna abrotanifolia.*
126. Mountains, 3 ft., yellow fl. in August. *Aspalathus nigra.*
127. Mountains, white fl. apparently in May. *Clusia alaternoides.*
128. Mountains, fl. August. *Xeranth. imbricatum.*

- No.
 129. Sandy hillocks along sea-coast, 3 ft., white fl. May. *Clusia tomentosa.*
 130. Clayey mountains, 3 ft., fl. May. *Hermannia alnifolia.*
 131. By streams, 6-7 ft., fl. September. *Phyllica racemosa.*
 132. Sandy veld, 3 ft., fl. August. *Leucad. Serraria.*
 133. Mountains, 3 ft., fl. white. *Thesium spicatum.*
 134. High mountains, far inland, 2-3 ft., fl. August. *Xeranthemum proliferum.*
 135. By streams, 4 ft., fl. September. *Sophora biflor.*
 136. On the Roode Zand, entire thicket, 6 ft., fl. October. *Leucadend.* —
 137. High mountains, 5 ft., fl. August. *Osteospermum junceum.*
 138. Mountains, 2 ft., fl. August. *Polygal. oppositif.*
 139. Rainy season, creeping, fl. yellow. *Aspalath. galioid.*
 140. Mountains, fl. August. —
 141. Mountains, 3 ft., fl. August. *Protea Serraria.*
 142. Mountains, fl. May. *Aster reflexus.*
 143. Level veld, 2 ft., fl. October. *Protea Leucad. barbata.*
 144. Rains, 2 ft., fl. August. *Osteospermum imbricatum.*
 145. Swartberg, 1 ft., fl. August. *Echium fruticosum.*
 146. Mountains, 3 ft., fl. August. *Arctotis paleacea.*
 147. Mountains, creeping, white fl. in August. *Diosma an rubrae ramis?*
 148. Rains, 2 ft., yellow fl. in August. *Athanasia genistifolia.*
 149. By streams, 6-8 ft., July. *Ceanothus africanus.*
 150. Mountains, 3-4 ft., yellow fl. in August. *Aspalathus argentea.*
 151. During rains, 2 ft., yellow fl. in August. *Aspalathus nigra.*
 152. Mountains, yellow fl. in August. *Aspalathus lotoides.*
 153. By streams, 3 ft., fl. October. *Sophora biflora.*
 154. Sandy veld, 2 ft., fl. July. *Leucad. imperfect.*
 155. Mountains, fl. August. *Gnaphal. discolorum.*
 156. Sea-shore, scrambling over cliffs, yellow fl. in August. *Gorteria setosa.*
 157. By streams, 8 ft., fl. May. *Protea parviflora.*
 158. Prostrate, yellow fl. in August. —
 159. Mountains, 3 ft., fl. August; named "Aster." *Aster polifolium.*
 160. Along the mountains, with short leaf and red fl. in August. —
 161. During rains, 2 ft., fl. August. *Selago frutescens.*
 162. High mountains, 4 ft., white fl. in August. *Euphorbia capensis.*
 163. Mountains, 6 in., fl. August. *Polygala umbellata.*
 164. In rains, 3 ft., fl. June. *Hermannia althæifolia.*
 165. By streams, 2 ft., fl. September. *Hermannia hyssopifolia.*
 166. Mountains, 4 ft., fl. August. *Leucad. nondum florens.*
 167. Mountains, creeping, fl. August. *Hermannia trifoliata.*
 168. During rains, brown fl. in August. *Tulbaghia capensis.*
 169. During rains, 3 ft., small red fl. in August. *Oxalis hirsuta.*

- No.
 170. Mountains, creeping, fl. October. *Polygala alopecurioides*.
 171. Sandy veld, 6 in., yellow fl. in October. *Buchnera capensis*.
 172. Sandy veld, 2 ft., fl. August. *Aspalathus verrucosus*.
 173. Sandy veld, 3 ft., fl. June. ———
 174. Mountains, 4 ft., fl. August. ———
 175. By streams, 4 ft., fl. August. *Turchonanthus camphoratus*.
 176. Sandy veld, 3 ft., fl. June. *Struthiola glabra*.
 177. Mountains, 3 ft., fl. December. *Athanasia parvifolia* [= *parviflora*].
 178. Mountains, 4 ft., fl. December. *Psoralea pinnata*.
 179. By streams, from mountains, in shady thickets. ———
 180. Sandy veld, fl. December. *Gnaphal. paniculatum*.
 181. Sandy veld, 3 ft., fl. December. *Gnaphal. crispum*.
 182. Sandy veld, 2 ft., fl. December. *Amellus lychnitis*.
 183. Mountains, in dry parched places, creeping, fl. November. *Gnaphal. muricatum*.
 184. On sand dunes, sea-coast, 2 ft., fl. December. *Conium rigens*.
 185. Same locality, creeping, fl. December. ———
 186. Mountains, 2 ft., fl. December. *Selago fasciculata*.
 187. Sea-coast, on sand-hillocks, prostrate, fl. December. ———
 188. Sandy veld, very strongly scented, fl. December. *Cotula tanacetii* [*folia*].
 189. Level ground not far from the sea, 2 ft., fl. December. *Chironia frutescens*.
 190. Sandy veld, 3 ft., fl. January. *Spartium capense*.
 191. Sandy veld, 2 ft., fl. December. *Aspalathus ciliaris*.
 192. Sandy veld, 2 ft., fl. December. *Dianthus* [*sp. au crenatus* ?].
 193. High mountains, fl. not seen. *Acrostichum pectinatum*.
 194. Sandy veld, 2 ft., fl. December. *Chironia linifolia*.
 195. Sandy veld, creeping, fl. December. *Frankenia hirsuta*.
 196. Sandy veld, creeping, fl. December. *Leucad. repens*.
 197. Sandy veld, 2 ft., fl. December. *Thesium paniculatum*.
 198. Sandy veld, 2 ft., fl. December. *Leucad. proteoides*.
 199. Sandy veld, 1 ft., fl. December. ———
 200. Sandy veld, 2 ft., fl. December. *Wachendorfia umbellata*.
 201. Sandy veld, 1 ft., yellow fl. in December. *Spartium capense*.
 202. Sandy veld, 3 ft., yellow fl. in December. *Aspalathus callosa*.
 203. Sandy veld, creeping, fl. yellow in December. *Spartium contaminatum*.

[Linné has written in Swedish at the end of this list:—]
 Governor Tulbagh at the Cape of Good Hope collected these with
 his own hand, and sent me these plants splendidly preserved.

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Xeranthemum canescens, 4.
— *umbellatum*, 128.
— *proliferum*, 124.
— *sesamoides*, 76.
— *speciosissimum*, 87.
Zygophyllum sessilifolium, 75.
— *spinosum*, 109.

CONTRIBUTIONS towards the History of the Linnean
Collections, by Dr. B. DAYDON JACKSON, R.N.O.,
General Secretary of the Linnean Society.

I.

History of the Linnean Collections, prepared for the
Centenary Anniversary of the Linnean Society.

Proc. 1887-88 (1890) pp. 18-34.

II.

On a Manuscript List of the Linnean Herbarium in the
handwriting of Carl von Linné, presumably compiled in
the year 1755. . . . To which is appended a Catalogue of the
Genera in the Herbarium, with the numbers of sheets of
specimens.

Prepared for the Anniversary Meeting of the Linnean
Society of London, 24th May, 1907, in celebration of the
200th Anniversary of the birth of Carl von Linné.

Proc. 1906-07 (1907) pp. 89-126.

III.

Index to the Linnean Herbarium, with indication of the
Types of Species marked by Carl von Linné.

Proc. 1911-12 (1912) Suppl. pp. 1-152.

IV.

Catalogue of the Linnean Specimens of Amphibia, Insecta,
and Testacea noted by Carl von Linné. Transcribed and codified.

Proc. 1912-13 (1913) Suppl. pp. 1-48.

V.

Correspondence between Carl von Linné and C. Rijk Tulbagh,
Governor of the Dutch Colony of the Cape of Good Hope.
Including a List of 203 specimens sent in or about the year 1767
to Upsala.

Proc. 1917-18 (1918) Suppl. pp. 1-13.

PUBLICATIONS : SESSION JULY 1917-JULY 1918.

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